JULY, 1947

Railway Engineering and Maintenance

Tightness

REALLY COUNTS ON THE CURVES

Twenty-four hours a day . . . 365 days a year . . . passenger and freight trains highball through Ohio over the tracks of the Erie Railroad. Curved track makes scenic right of way, but maintenance-of-way engineers know the stress, strain and extra wear that heavy loads develop on curves. This requires reliable always-tight rail joint assemblies.

That's why you'll find Reliance Hy-Pressure Hy-Crome Spring Washers specified for most rail joint assemblies. Where constant steady tension is required Reliance Hy-Pressure Hy-Crome Spring Washers meet the demands. This washer is designed especially for rail joint assemblies where its inherent reactive values compensate for inevitable looseness resulting from wear.

The non-fatiguing Reliance Hy-Pressure Hy-Crome Spring Washers hold vital rail joint assemblies TIGHTER LONGER and keep traffic moving by maintaining trouble free track, even on curves where the impact is toughest.

EATON

EATON MANUFACTURING COMPANY

OFFICES AND PLANT **MASSILLON, OHIO**

Reliance Division

Sales Offices: **New York • Cleveland • Detroit • Chicago • St. Louis • San Francisco • Montreal**

Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Cicago 3, Ill. Subscription price: United States and Possessions, and Canada, $2.00 for one year; $3.00 for two years. Single copies 50 cents. Entered as second-class matter January 20, 1933, at the post office at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., post office. Address communications to 105 W. Adams St., Chicago 3, Ill.

Placing and grading ballast coated with *Texaco Asphalt*. Two parts 2" stone and 1 part ¾" stone.

BETTER BALLAST

FOR THOSE HARD-TO-DRAIN SPOTS

WHEREVER track is particularly hard to drain — as at approaches to open floor bridges, under overhead structures, and adjoining station platforms — you can assure proper drainage and materially reduce your maintenance costs, by coating the stone ballast with *Texaco Asphalt*.

Texaco Asphalt forms a waterproof sealcoat that sheds water quickly and prevents fouling with dirt and cinders. In addition, the asphalted ballast keeps track in good line and surface longer. It stays flexible, does not crack under heavy traffic, and can be tamped even after long service.

The use of quality asphalt — *Texaco Asphalt* — in preparing this better ballast is important. The high quality of *Texaco Asphalt* has been proved by its wide use for 40 years on America's streets, highways and railroads.

Find out in detail how *Texaco Asphalt* can help you reduce track maintenance. Call the nearest Railway Sales Division Office listed below, or write The Texas Company, *Railway Sales Division,* 135 East 42nd Street, New York 17, N. Y.

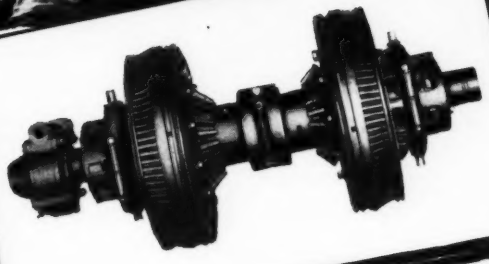
NEW YORK • CHICAGO • SAN FRANCISCO • ST. PAUL • ST. LOUIS • ATLANTA

TEXACO

TEXACO Asphalt for Coating Ballast

Tune in . . . TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

Check the Swinging before you buy a crane



YOU CAN'T DO THIS WITH A TRACK CRANE

SMOOTH swinging is important. It plays a part both in the life of the machine and the safety of the load. Grabbing, jerking, swing clutches can wreck both and be the source of injury to personnel.

Northwest Swing Clutches are *uniform pressure* clutches and are above comparison with ordinary band type clutches. No band type clutch can be a uniform pressure clutch.

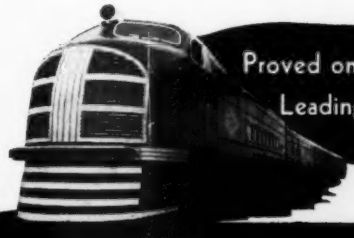
Northwest Uniform Pressure type Swing Clutches mean smooth, easy engagement, accurate control when spotting the load, cool running, freedom from machine wracking jerks and grabs, and longer life under all conditions.

In Northwest Swing Clutches you have another of the many Northwest features that combine to give smoother operation, greater output and get those maintenance-of-way jobs done faster. Northwests do things no track type machine can do. Plan now to be Northwest equipped.

NORTHWEST ENGINEERING COMPANY
1513 Field Building, 135 South LaSalle Street, Chicago 3, Illinois

NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL



Proved on the Nation's Leading Railways

Substantial Economies in Track Maintenance Demonstrated by

PRESSURE GROUTING

No slow orders. Grouting gang stands aside as fast train passes pressure grouting operation on Wabash Railroad, at Grabill, Ind.

PRESSURE GROUTING

Stiffens the subgrade.
Prevents surge action of water.
Transforms water pockets into load-spreading slabs.
Helps keep tracks in line and surface.
Makes ties last longer.

It has been amply demonstrated during the past ten years that pressure grouting with portland cement under main-line track corrects subgrade troubles and consistently effects important savings in the maintenance of track.

One major railroad system which has grouted thousands of feet of track in many different locations reports that the amount saved by reduced maintenance within a few months, exceeded the entire expense of grouting.

Pressure grouting is now a standard maintenance operation on more than 35 major railroads. It requires no capital expenditure. Work may be done by foreman and small gang of track laborers with simple equipment.

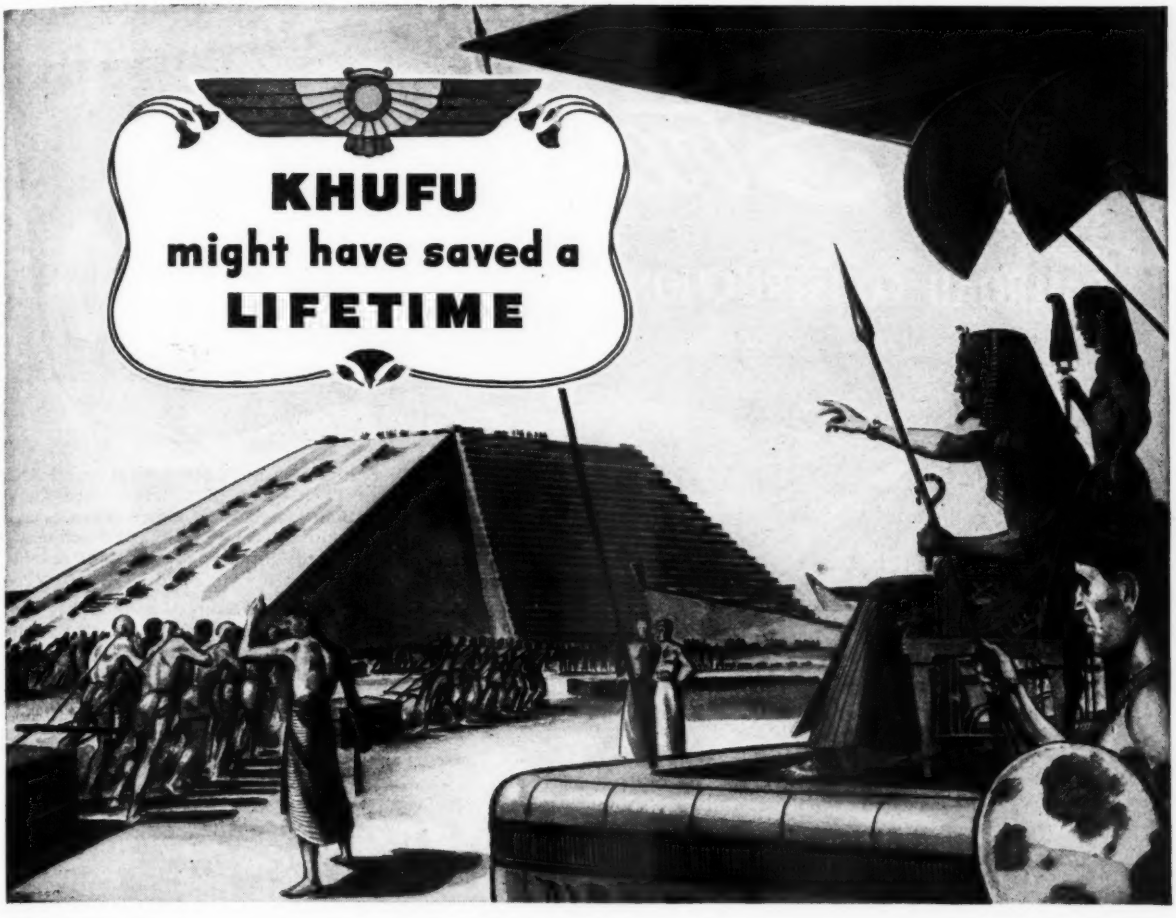
Our engineers have developed valuable experience on grouting under field conditions. Let us help you determine how grouting can solve your track maintenance problems.

PORTLAND CEMENT ASSOCIATION

Dept. A7-27, 33 W. Grand Ave., Chicago 10, Ill.

A national organization to improve and extend the uses of concrete ...through scientific research and engineering field work

BUY U. S. SAVINGS BONDS



KING KHUFU had only *slave*-power with which to build the greatest of the pyramids. With engine-power, he might have saved a lifetime and the lives of 300,000 slaves.

Today, mightier and much more useful structures spring from dream to drawing board to reality in relatively short spans of time. Modern construction equipment powered by internal-combustion engines makes this possible. For today, the machine is the slave of man. Great dams, soaring bridges, towering buildings and broad highways are ours without backbreaking toil and wasted flesh and blood.

AMERICAN BOSCH CORPORATION, SPRINGFIELD 7, MASS.

PARTNERS IN THE PROGRESS OF POWER

American Bosch works closely with and for the internal-combustion-engine industry in three vital ways:

ENGINEERING. 1,200,000 *man-hours* of it have been poured into Diesel Fuel Injection alone—other millions into Ignition.

PRODUCTION. *Premium performance* has been a consistent goal in the production of hundreds of thousands of Diesel injection systems and millions of electrical units.

MAINTENANCE. *The world over,* American Bosch authorized service stations keep the equipment operating efficiently.

AMERICAN BOSCH

DIESEL FUEL INJECTION • AUTOMOTIVE AND AVIATION ELECTRICAL PRODUCTS

for YOU

An invitation . . . to personally inspect and see the newest and finest in railroad track equipment and supplies . . . and to visit with your railroad friends and discuss the developments and actual experiences in track and bridge and building problems.

one JOINT EXHIBIT

TRACK SUPPLY ASSOCIATION

BRIDGE & BUILDING SUPPLY MEN'S ASSOCIATION

HOTEL STEVENS, CHICAGO
SEPTEMBER 15-16-17-18

The success of last year's combined exhibit of these two associations inspired a repeat performance.

The exhibit will open a day before the conventions, to give you ample time for inspecting the latest developments in materials and equipment, all conveniently assembled in one exhibition hall under the same roof as the conventions.

two CONVENTIONS

ROADMASTERS & MAINTENANCE OF WAY ASSOCIATION OF AMERICA

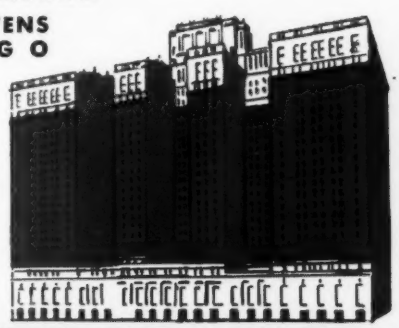
AMERICAN RAILWAY BRIDGE & BUILDING ASSOCIATION

All railroad men concerned with maintenance of track and structures will want to profit by attending the convention meetings. Make plans now to attend these important events.

all three SAME TIME — SAME PLACE

SEPTEMBER 15-16-17-18

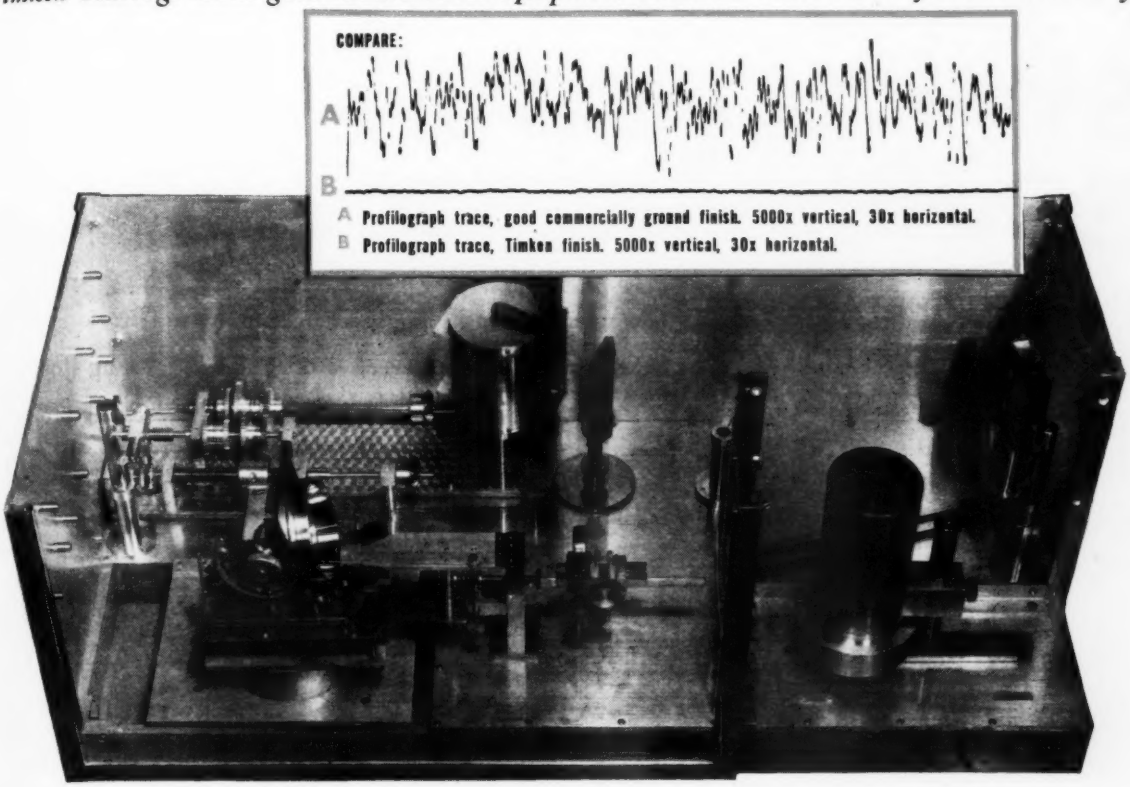
HOTEL STEVENS CHICAGO



TRACK SUPPLY ASSOCIATION
BRIDGE & BUILDING SUPPLY MEN'S ASSOCIATION

59 EAST VAN BUREN STREET, CHICAGO 5, ILLINOIS

Timken bearings make good maintenance equipment better . . . here's one of the reasons why:



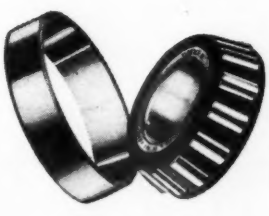
Answers the question— "How rough is smooth?"

ONE of the reasons Timken tapered roller bearings perform with such frictionless, wear-free ease is the amazingly smooth surface finish on the rolls and races —the finest known to modern bearing science.

Now, when you talk about finishes like this, you're talking about surface irregularities of only a few millionths of an inch—irregularities which are impossible to detect by any ordinary means. So, when Timken first began to develop this finish, one of the biggest obstacles was the absence of an accurate method of measuring the roughness of an apparently smooth surface.

The profilograph pictured above was the answer. Developed by Timken in 1928 and steadily improved since then, the profilograph determines surface irregularities to within one-millionth of an inch. Equipped with this measuring stick, Timken engineers were able to develop new finishing methods and machines, which have resulted in the microscopic surface accuracy of the Timken bearings you use today.

Every factor in the efficiency of a bearing is approached at Timken in this same scientific manner. For example, Timken makes its own steel to assure constant quality. And Timken is the acknowledged leader in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels. No wonder you can always be sure of uniformly top quality and performance in the Timken bearings you use. The Timken Roller Bearing Company, Canton 6, Ohio.



TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

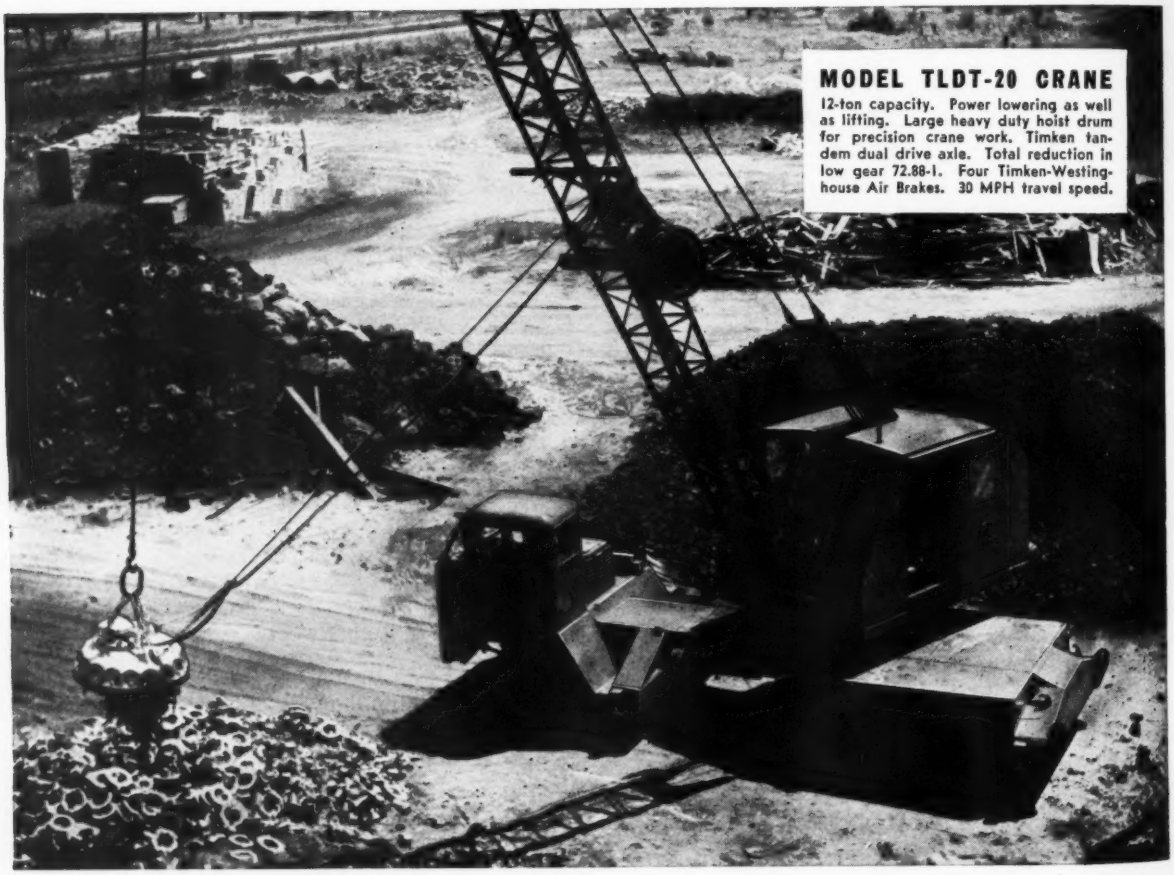
TAPERED ROLLER BEARINGS

NOT JUST A BALL NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER BEARING TAKES RADIAL AND THRUST LOADS OR ANY COMBINATION

SPEED and ECONOMY on Wheels!

GET ALL THE FACTS •
Send for BULLETIN RE-77
•
FINGERTIP AIR CONTROLS
3/8 YD. and 1/2 YD. SHOVELS
6 to 12 TON CRANES

No waiting—no delays! Out on the job or around the yard MICHIGAN Mobile CRANE'S time-saving, cost-cutting operating speed, economy and truck mobility pays off on every lifting and excavating job. Long-time MICHIGAN owners will tell you that for crane, clamshell, dragline, trench hoe and shovel work the fully convertible MICHIGAN Mobile SHOVEL-CRANE is truly "speed and economy on wheels"!



MODEL TLDT-20 CRANE
12-ton capacity. Power lowering as well as lifting. Large heavy duty hoist drum for precision crane work. Timken tandem dual drive axle. Total reduction in low gear 72.88-1. Four Timken-Westinghouse Air Brakes. 30 MPH travel speed.

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

For additional information, use postcard, pages 645-646

CROSSING MAINTENANCE WAS "Stopped in its tracks" BY THIS RAILROAD

Here's how the Boston & Maine Railroad did something about a problem that faces every carrier. In this crossing at Manchester, N.H., they installed a Koppers Creosoted Timber Panel Grade Crossing.

These crossings are strong and durable. They maintain the traffic surface at installed grade under heavy wheel loads. They do not spall, sag, "washboard" or disintegrate. Pressure-treatment protects against decay.

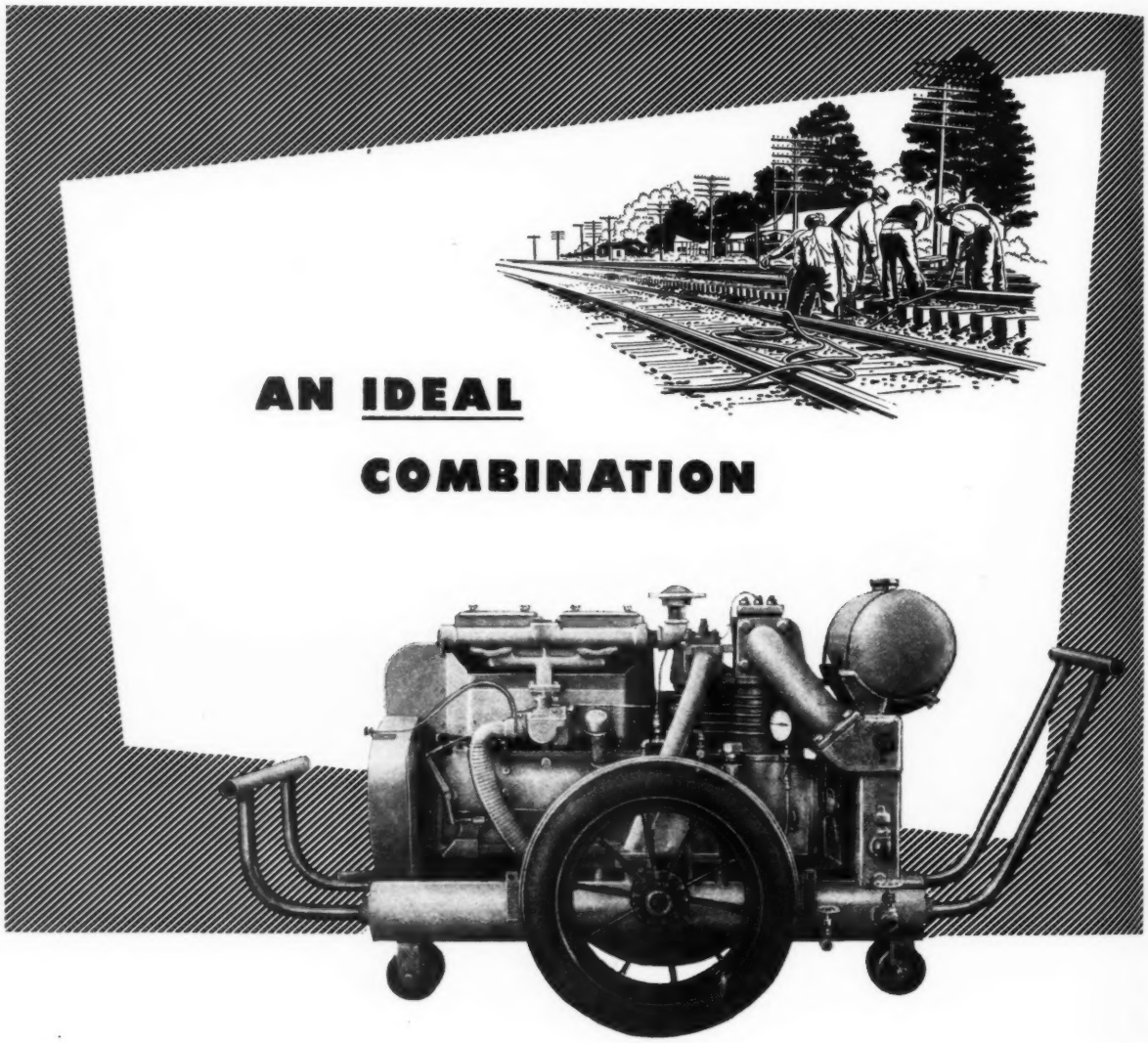
Koppers Grade Crossing panels are built up from selected hardwood members, assembled with spiral-drive dowels, and shipped completely assembled. No crane is necessary for installation; they can be handled and placed by workmen. Panels can be removed at any time for track maintenance, and replaced.

With a national average of one highway crossing for every mile of railroad line, crossing maintenance is a costly item in every budget. At heavily traveled intersections, where the crossing must endure severe punishment, Koppers Creosoted Timber Panel Grade Crossings offer a proven means of reducing this cost. For general information and construction details, ask for Bulletin G-26.

K KOPPERS **PRESSURE-TREATED WOOD**

KOPPERS COMPANY, INC.

PITTSBURGH 19, PENNSYLVANIA



AN IDEAL COMBINATION

for spot tamping and track repair work

The CP Patrol Compressor, having an actual capacity of 60 c.f.m., at 100 pounds pressure, will operate four CP-3D Tie Tampers, or two CP-116 or CP-117 Spike Drivers. It is easily transported and handled; front and rear retractable dollies facilitate tight-spot, single-rail handling "on track" and 4-point support "off track."

CP-3D Tie Tampers are especially efficient for nipping and small rises, as well as on jobs where the track is raised several inches.

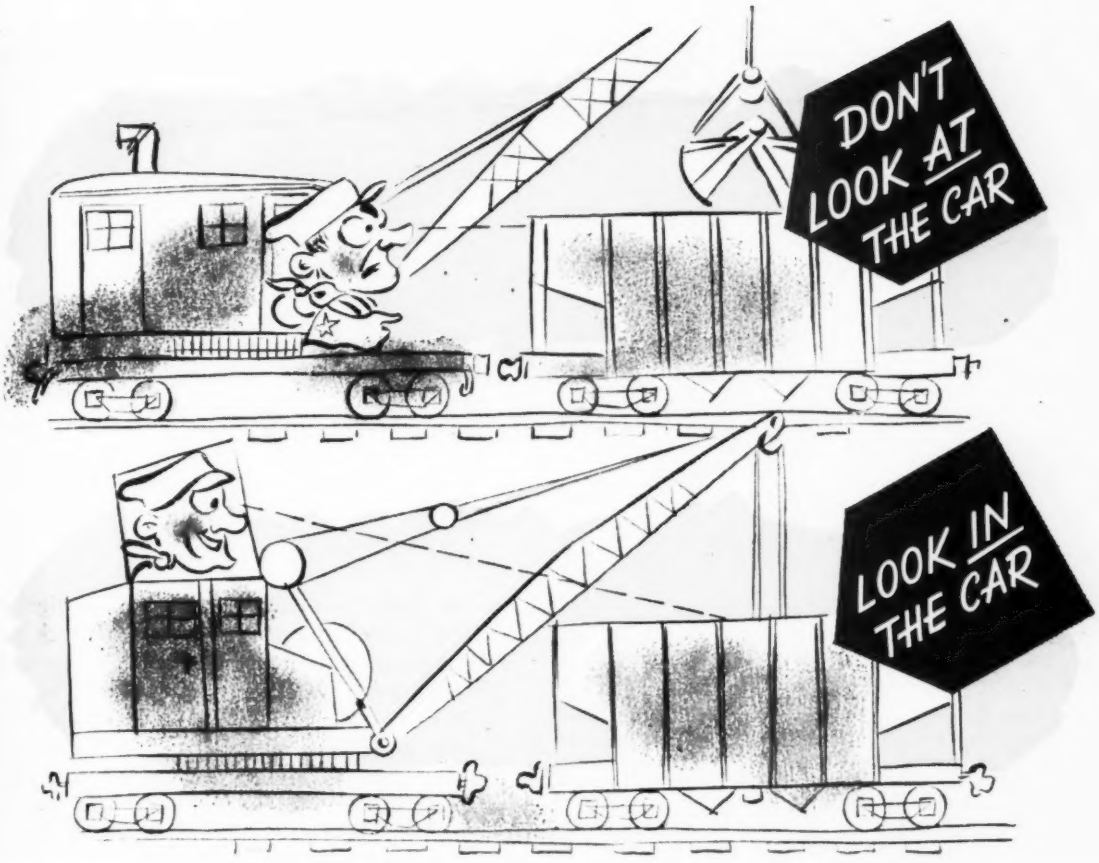
Write for complete information.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

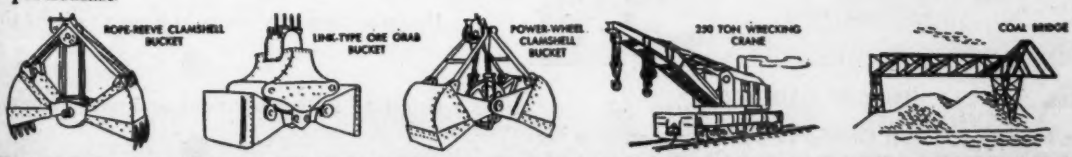
For additional information, use postcard, pages 645-646



You *SEE* what you're doing from the monitor-type cab of the BROWNHOIST DIESEL LOCOMOTIVE CRANE

When you load material in or out of a railroad gondola car with a Brownhoist Diesel Locomotive Crane, you look right *into the car*—not simply at it. You *know* what you're doing—you don't guess. That's because you're in the patented Monitor-Type cab that stations the crane operator well above the hoisting mechanism—assures a commanding overall view in front, to the rear, and on both sides. Brownhoist 360° visibility means greater materials handling *efficiency, speed, and safety,* because it eliminates hazardous guesswork, awkward maneuvering, and peering around corners. Add to this great advantage the many superior Brownhoist engineering features—finger-tip controls, rotating and travel friction disc clutches with 1-point adjustment, anti-friction bearings, 14″ safety clearance between car body and rotating bed, one-piece cast steel bed, and many others—and you get the *absolute tops* in efficient, economical crane performance with hook, magnet, or bucket. Write for complete particulars

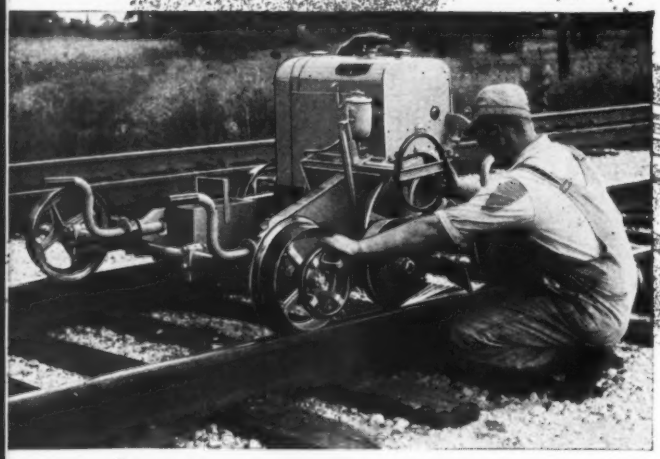
Brownhoist builds better cranes



INDUSTRIAL BROWNHOIST CORPORATION • BAY CITY, MICHIGAN

DISTRICT OFFICES: NEW YORK, PHILADELPHIA, CLEVELAND, CHICAGO • AGENCIES: DETROIT, BIRMINGHAM, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO, SEATTLE, VANCOUVER, B. C., WINNIPEG, CANADIAN BROWNHOIST LTD., MONTREAL, QUEBEC.

Select a NORDBERG GRINDER



SURFACE GRINDER TYPE WG

This Surface Grinder is for heavy duty grinding of rail reconditioned by welding. Its use is recommended where big output of smooth, accurately surfaced rail joints are desired.

MIDGET GRINDER

The Nordberg Midget Grinder is a one man machine for surfacing welded rail joints, removing mill tolerance, equalizing height of cropped rail, removing humps from hardened rail ends and grinding out corrugations and wheel burns. Cupwheel grinds with extreme accuracy. Due to its light weight it is especially adapted for use in congested traffic areas.

• These five rail grinders were designed to accomplish a higher standard of track maintenance and be best suited for the conditions under which the machines must operate. Whether it is big output of ground joints per day or the reconditioning of a switch or crossover, there is a Nordberg Grinder that will do a most satisfactory job with minimum time and expense. The machines were also designed to provide the utmost in versatility. When equipped with flexible shaft and provided with various grinder accessories, they can be used for a wide variety of grinding work encountered in track maintenance. With grinding operations being used more and more in maintenance work, it will pay to investigate the many advantages offered in this complete line of Nordberg Grinders.

Surfacing rail reconditioned by welding.

●

Slotting rail ends quickly and easily.

●

Removing flow at switchpoints and stock rails.

●

Grinding reconditioned frogs and flangeways.

●

Undercutting stock rails to house switchpoints.

●

Grinding out corrugations and wheel burns.

●

Equalizing height of old or cropped rail.

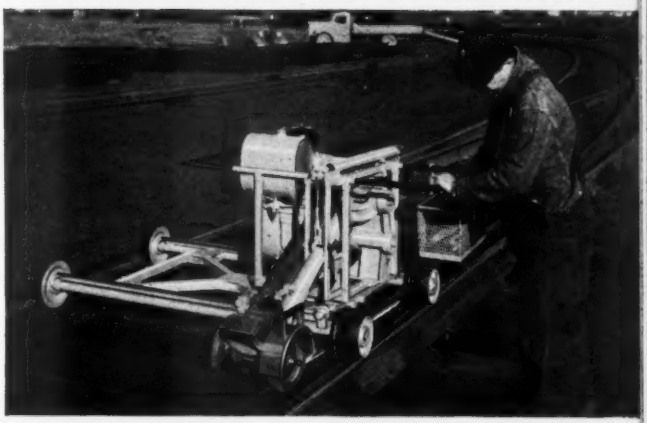
●

Removing mill tolerance of new rail.

for all RAIL GRINDING WORK

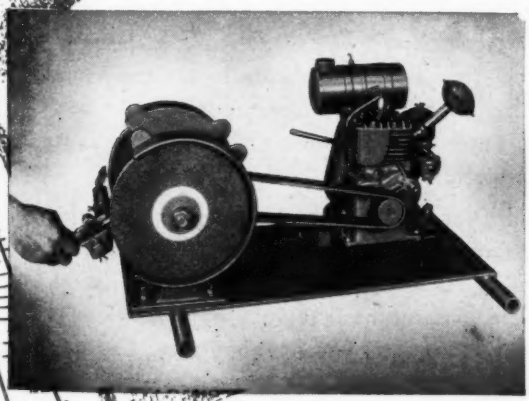
SURFACE GRINDER TYPE DG

This Nordberg Surface Grinder is a light weight machine designed for small crews working in congested traffic areas. While primarily used for surface grinding of welded rail ends and built-up frogs and crossings, when furnished with flexible shaft and grinder accessories, it can be adapted to other kinds of rail grinding work.



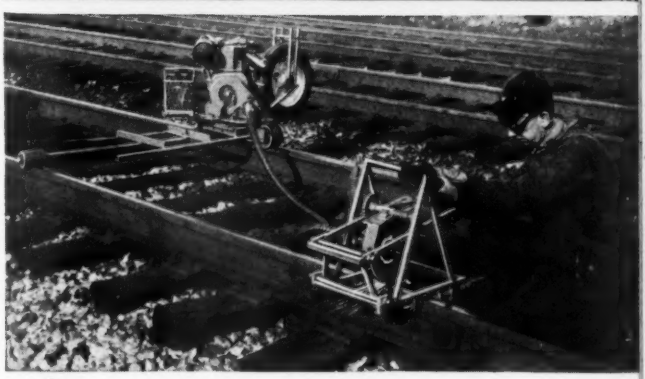
FLEXIBLE ARM GRINDER

The outstanding features of the Nordberg Flexible Arm Grinder is the ease and convenience in reaching places in the track where grinding is to be done and the rapid rate at which metal is removed. This is made possible by mounting the grinding wheel on the flexible arm which enables a greater variety of grinding being done than is possible with any other grinder.



BIT GRINDER

This simple, light weight, engine driven Bit Grinder while originally used for grinding cutter bits for Nordberg Adzing Machines, is also applicable for grinding tools at yards, terminals or wherever maintenance operations are concentrated.



UTILITY GRINDER

The Nordberg Utility Grinder with its flexible shaft drive has many applications for maintaining rail. It reaches any part of the track structure and can be used for slotting rail ends, switchpoint and stock rail grinding, surface grinding and frog and crossing maintenance.

NORDBERG MFG. CO. Milwaukee 7, Wis.

NORDBERG DEVELOPED A FULL LINE OF POWER TOOLS

For Your Maintenance Work

TIE TAMPING MACHINE • SPIKE HAMMER • SPIKE PULLER • POWER WRENCH • RAIL DRILL
CRIBEX • POWER JACK • FIVE RAIL GRINDERS

This is happening to YOU...

if water mains are clogged and incrustated

CLEANING RESULTS

Removal of 5" deposit and obstruction from 13" line increased water delivery from 877 gpm to 2,500 gpm. Locomotive taking time for 10,000 gallons of water was reduced from 11½ minutes to 4 minutes!

THERE'S a stealthy hand at work within those water service lines, constantly plucking away at valuable maintenance dollars! Tuberculation and lime deposits are continually reducing pipe diameters, and as flow capacity goes down, pumping costs go up! Water servicing of locomotives takes longer! Fire protection becomes less!

Make certain that your road is not a victim of this hidden source of lost maintenance dollars. Call in a Pittsburgh Pipe Cleaner specialist TODAY, and learn how Pittsburgh's advanced pipe cleaning methods restore water service lines to fullest capacity . . . quickly and economically. Learn too how Pittsburgh's Eric process of pipe lining protects pipe from corrosive waters and extends useful service many years. Both cleaning and lining can be accomplished in one job with a minimum of service interruption.

PITTSBURGH PIPE CLEANER COMPANY

133 Dahlem St., Pittsburgh 6, Pa.

PHILADELPHIA · BALTIMORE · WASHINGTON · NEW YORK · BUFFALO · CHICAGO · CINCINNATI · ST. LOUIS · DETROIT · BOSTON

ADDITIONAL INFORMATION

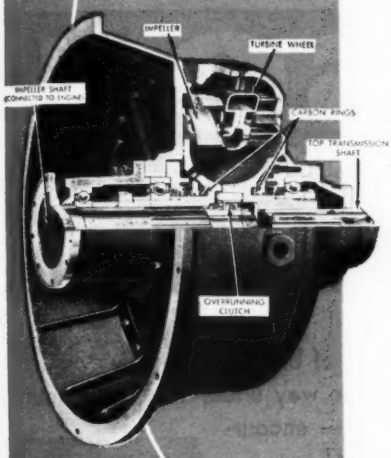
On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

Products Index

TORQUE CONVERTER TRACTORS

WHAT THE MEN WHO OWN THEM SAY:



Cross-section view of Torque Converter

MIDWEST OWNERS

Tried, tested, proved! First Torque Converter Tractor led to purchase of seven additional units. More on order.

S. A. Healy Co., Chicago, Illinois

"Have 12,000 hours on our Torque Converter Tractor and it is still in good condition. Has moved many thousands of yards of dirt with minimum repair cost."

De Ruyter Brothers, Willmar, Minn.

"Less shifting feature is appreciated by operator. Steering clutches last longer. Tractor requires less servicing because shock is absorbed."

John Dehner, Fort Wayne, Indiana

"Ability to constantly increase motor power without 'clutching' cannot help but reduce to no small extent, the wear and tear on transmission and drive."

Schuermann Building & Realty Co., St. Louis, Mo.

EASTERN OWNER

"Moves 20 percent more yardage, yet upkeep cost is about half that of conventional tractors."

Mills, Gorman and McAllister, Wendell, West Virginia

WESTERN OWNERS

"Not interested in any tractor that does not have Torque Converter."

John Iben, Phoenix, Arizona

"Easier and smoother operation. Less breakage of either pulled or pushed machinery or cable. Use two units—pull scrapers, land planes and rippers, clearing and leveling desert land."

Hanson Farms, Casa Grade, Arizona

SOUTHWEST OWNERS

"Torque Converter Tractor is finest bulldozer tractor ever built. We also use a Torque Converter Tractor with a scraper and haul more dirt faster and cheaper because of time saved shifting gears. Low upkeep on tractors and auxiliary equipment."

Olene Hanson, Houston, Texas

"Never had a tractor which moves dirt as quickly and cheaply as a Torque Converter. Got 3,000 hours on my first one and no trouble yet. Now own three."

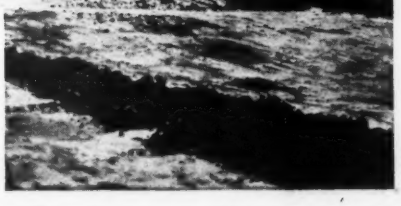
Storms Construction Co., Pampa, Texas

NORTHWEST OWNER

"Get one-third more production and smoother performance than with conventional tractor. Less operator fatigue."

Wirkhala Bros., Naselle, Wash.

Like these users, you can lower cost, step up yardage moved with Allis-Chalmers Torque Converter Tractors. Here is "get up and go" performance with less gear-shifting. Operation is continuously smooth—starting, pushing, pulling. This all adds up to more work done, less maintenance, MORE PROFIT! Now is the time to investigate.



ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

DOWELL

SUBSIDIARY OF THE DOW CHEMICAL COMPANY

Fire tube boilers cleaned quickly

—designed operating efficiency restored!

The Dowell chemical method of cleaning fire tube boilers has grown steadily in acceptance by operating engineers who have found it a rapid, safe and effective cleaning technique. Reduced operating costs naturally follow when accumulated scale and sludge are chemically removed from boilers, condensers, heat-exchange equipment, water lines and water wells.

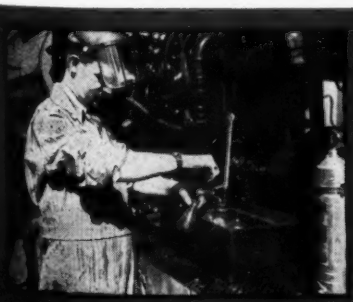
Dowell equipment is used to fill the unit with liquid solvents designed to dissolve and disintegrate scale and sludge deposits. Dowell engineers supervise the entire cleaning operation—they are experienced in practical methods, know which solvents to use, and bring with them special truck-mounted tanks, pumps, mixers, heaters and control equipment.

Call the nearest Dowell office for estimates of the cost of cleaning your equipment.

DOWELL INCORPORATED • TULSA 3, OKLAHOMA

New York • Boston • Philadelphia • Wilmington • Baltimore • Pittsburgh
Buffalo • Cleveland • Cincinnati • Detroit • Chicago • St. Louis • Kansas City
Wichita • Oklahoma City • Houston • Fort Worth • Shreveport • Mt. Pleasant, Michigan • Salem, Illinois • Borger, Texas • Wichita Falls, Texas
Midland, Texas • Lafayette, Louisiana

Long Beach, Casper: Dowell Associate—International Cementers, Inc.

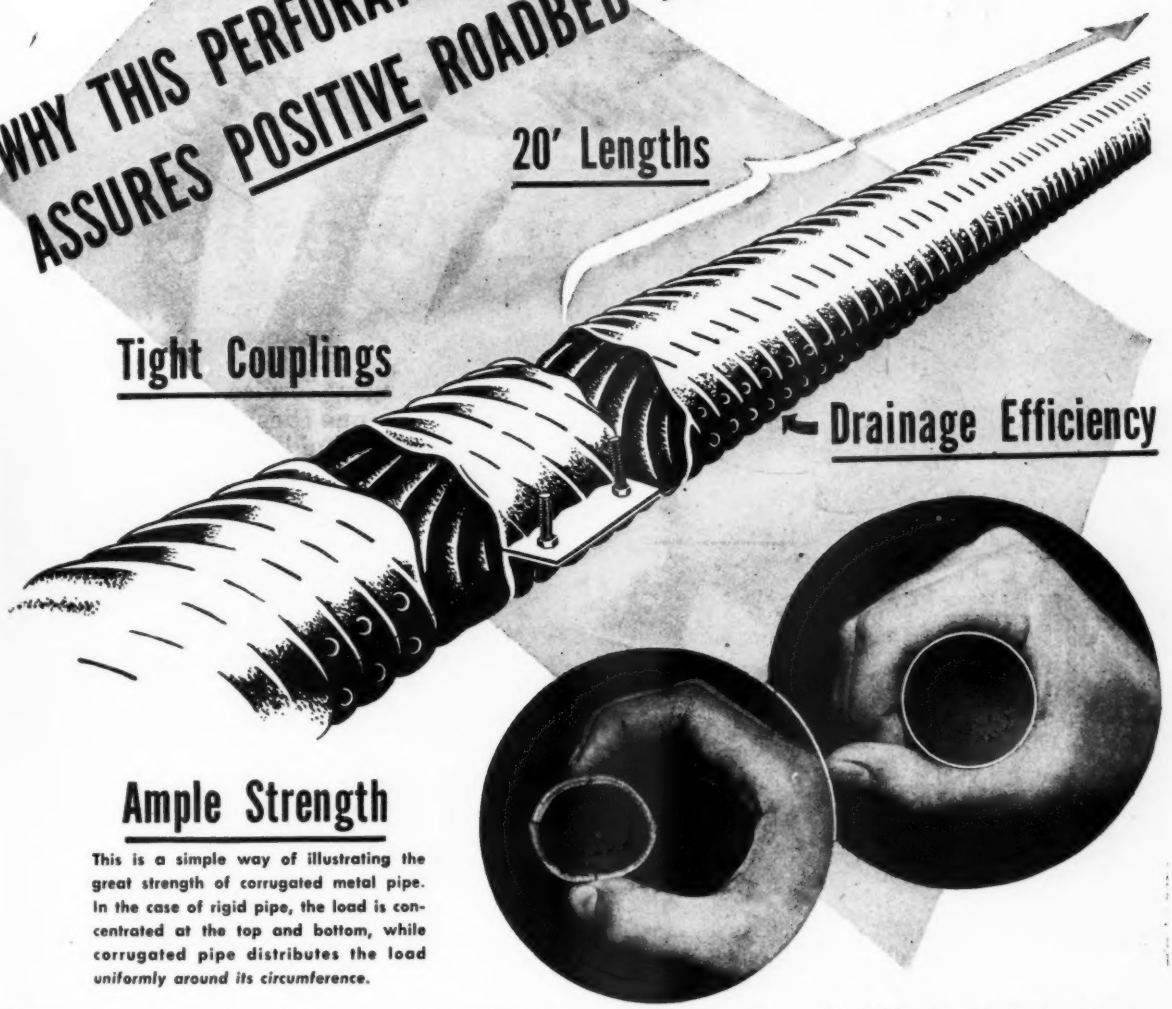


Dowell service is supervised by trained engineers using carefully selected liquid solvents and special mobile equipment.

DOWELL

FOR INDUSTRIAL CHEMICAL SERVICE

WHY THIS PERFORATED ARMCO PIPE ASSURES POSITIVE ROADBED DRAINAGE



Ample Strength

This is a simple way of illustrating the great strength of corrugated metal pipe. In the case of rigid pipe, the load is concentrated at the top and bottom, while corrugated pipe distributes the load *uniformly around its circumference.*

These are four important reasons why ARMCO Perforated Pipe gives quick, positive drainage where ballast pockets prove troublesome.

Long lengths mean there is less chance for your subdrainage systems to get out of order because of localized soil-shifts. Strong, tight, bolted joints hold the 20′ sections *securely together.* Individual sections of pipe don't get out of line.

ARMCO Pipe is corrugated for high inherent strength. It also has the ability to deflect slightly under loads. This compresses the soil at the sides and tends to equalize the pressure around the entire pipe, thereby increasing its load-carrying capacity. The small, evenly spaced perforations in ARMCO Pipe admit the water freely but exclude the surrounding backfill.

Stabilized with ARMCO Perforated Pipe, your roadbeds need less maintenance. Costs go down. Speed restrictions are lifted. Ballast pockets are completely drained.

For complete information about ARMCO Perforated Pipe, write your nearest Armco Drainage & Metal Products, Inc. office—or the general offices of the company, 3525 Curtis Street, Middletown, Ohio.

ARMCO

Armco Drainage & Metal Products, Inc.

HUBBARD

Super Service

Alloy Spring Washers

Continuous cushioning protection against the hazards of heavy traffic and high speeds are provided by Super Service Washers. Their high reactive qualities retard rail joint assembly wear and aid elimination of frozen joints. Savings in track labor and material are substantial.

EXHIBITOR
BRIDGE & BUILDING TRACK SUPPLY ASSOCIATION
HOTEL STEVENS, CHICAGO
SEPT. 15-16-17-18, 1947

HUBBARD and COMPANY
Tool Division

From RAILWAY AGE

Union Completes Major Improvements

The track on the bridge structures is laid on 33 creosoted ties per 39-ft. panel, with 10-in. by 13¾-in. double-shoulder tie plates, and the track on ballast is set on 22 creosoted ties per 39-ft. rail length with 7¾-in. by 14¾-in. double-shoulder tie plates. The rail is of 131-lb. section, anchored by 16 compression-type rail anchors of the Rails Company per rail on the bridges and 12 per rail on ballasted track. The ties on the bridge structures are anchored to the decking by ¾-in. galvanized

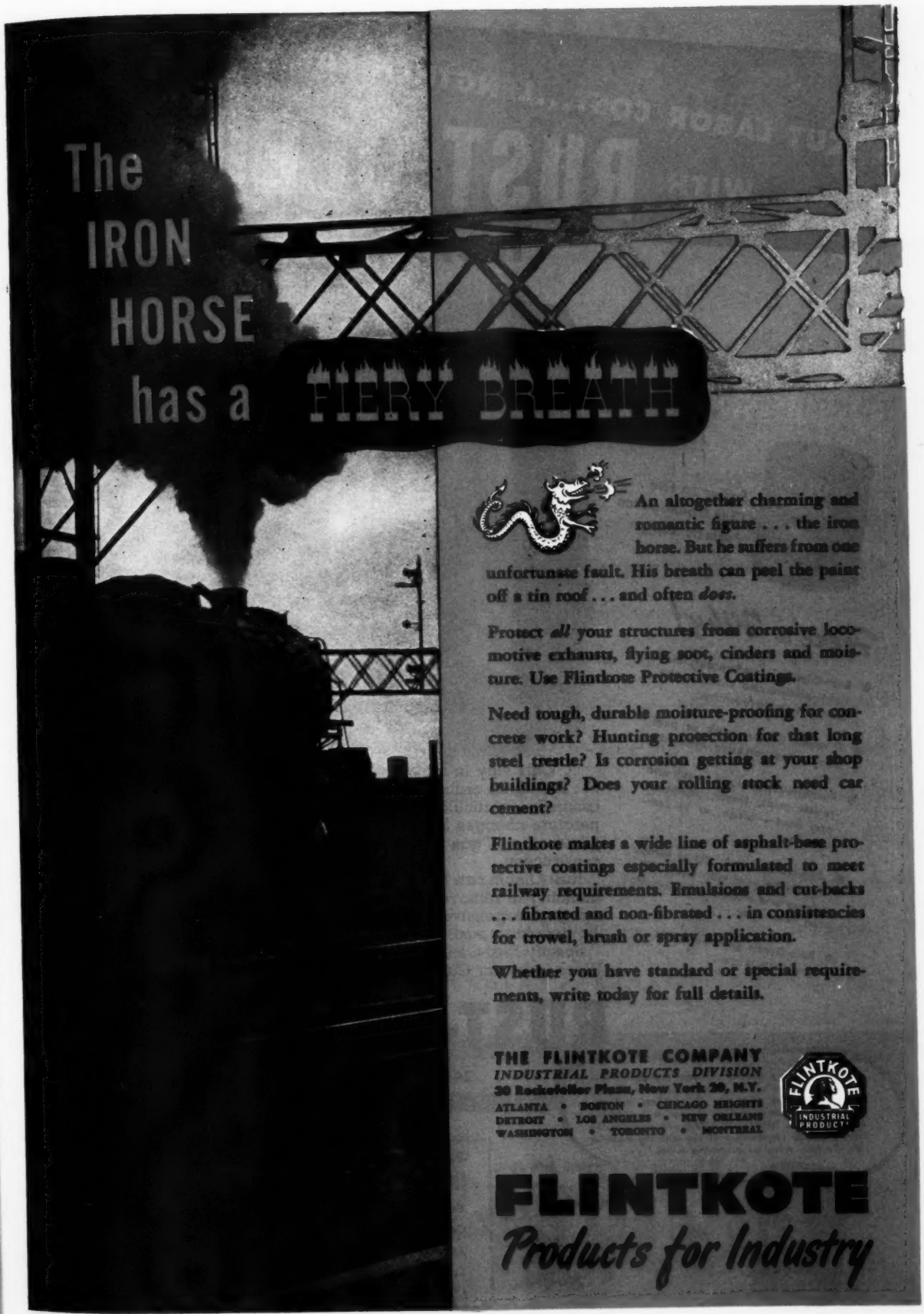
Railway Age—Vol. 122, No. 10

THE RAILS COMPANY

General Office

178 GOFFE STREET, NEW HAVEN 11, CONN.

ST. LOUIS, MO. HOBOKEN, N. J. CHICAGO, ILL.



An altogether charming and romantic figure . . . the iron horse. But he suffers from one unfortunate fault. His breath can peel the paint off a tin roof . . . and often *does*.

Protect *all* your structures from corrosive locomotive exhausts, flying soot, cinders and moisture. Use Flintkote Protective Coatings.

Need tough, durable moisture-proofing for concrete work? Hunting protection for that long steel trestle? Is corrosion getting at your shop buildings? Does your rolling stock need car cement?

Flintkote makes a wide line of asphalt-base protective coatings especially formulated to meet railway requirements. Emulsions and cut-backs . . . fibrated and non-fibrated . . . in consistencies for trowel, brush or spray application.

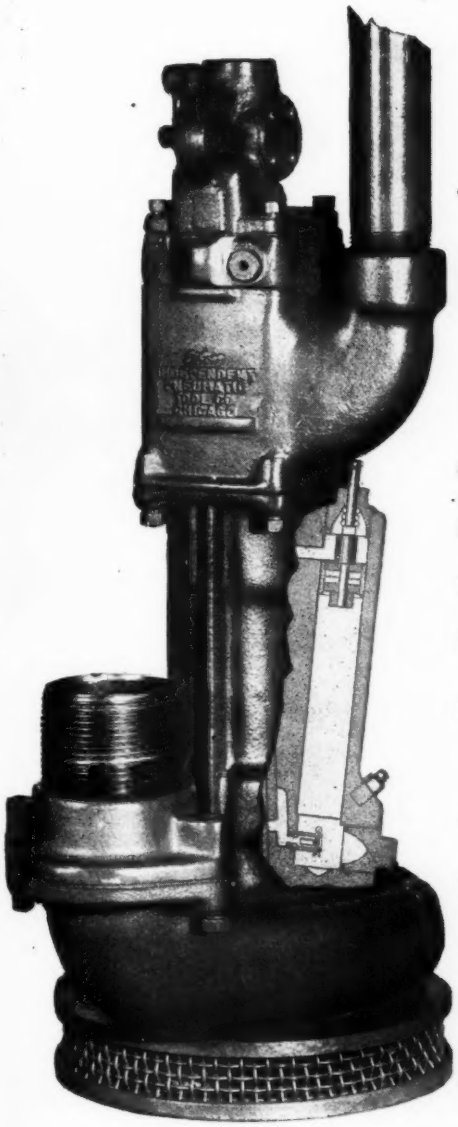
Whether you have standard or special requirements, write today for full details.

THE FLINTKOTE COMPANY
INDUSTRIAL PRODUCTS DIVISION
30 Rockefeller Plaza, New York 20, N.Y.
ATLANTA • BOSTON • CHICAGO HEIGHTS
DETROIT • LOS ANGELES • NEW ORLEANS
WASHINGTON • TORONTO • MONTREAL

FLINTKOTE INDUSTRIAL PRODUCT

FLINTKOTE
Products for Industry

Thor SUMP PUMPS Keep Pumping!



. . . Improved Lubrication Assures Peak Efficiency

In Sump Pumps, the *impeller shaft bearings* are the most vulnerable parts, with premature failure causing undue job delay and expense. Thor safeguards these vital points by a large grease reserve that is force-fed under continuous air pressure—pressure that further prevents foreign matter from working into the bearings. Because of this *exclusive feature*, Thor Pumps can be operated continuously up to a full shift without regreasing.

Thor Sump Pumps are designed to operate efficiently in clean or dirty water; in oil, sludge or sewage—either partially or fully submerged. Your nearby Thor Distributor will gladly demonstrate them as the economical answers to your sump-water problems.

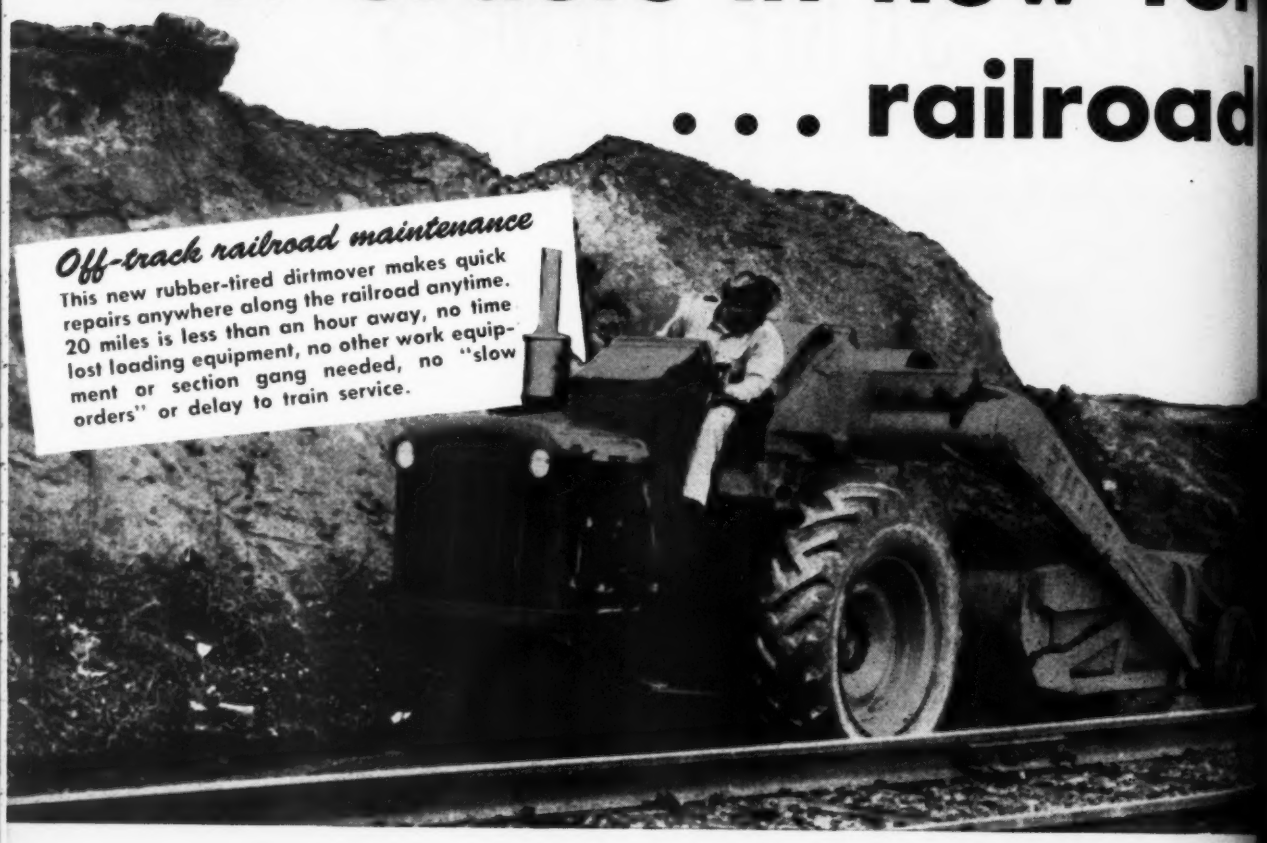
INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Blvd., Chicago 6, Illinois

Birmingham · Boston · Buffalo · Cincinnati · Cleveland · Denver · Detroit
Houston · Los Angeles · Milwaukee · New York · Philadelphia · Pittsburgh
St. Louis · St. Paul · Salt Lake City · San Francisco · Toronto, Canada · London, England

Thor PORTABLE POWER TOOLS

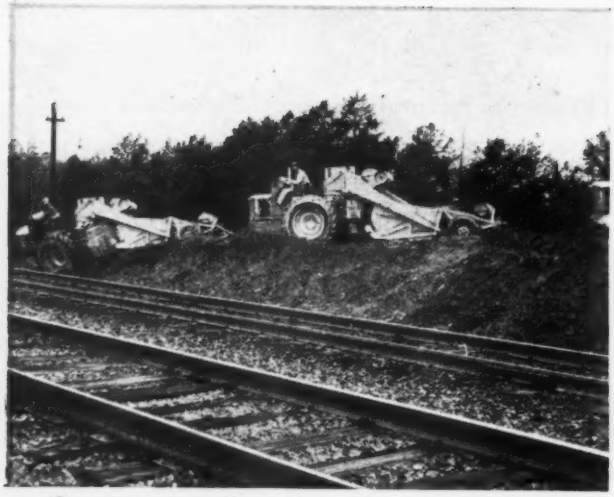
PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

Get orders in now for
. . . railroad



Off-track railroad maintenance

This new rubber-tired dirtmover makes quick repairs anywhere along the railroad anytime. 20 miles is less than an hour away, no time lost loading equipment, no other work equipment or section gang needed, no "slow orders" or delay to train service.



Grading right-of-way

You will find this small, off-the-track Tournapull extremely useful on cutting down and filling in along railroad right-of-way. Rig is self-loading . . . works alone or in fleet operation. Speeds to 23 m.p.h.

Material handling

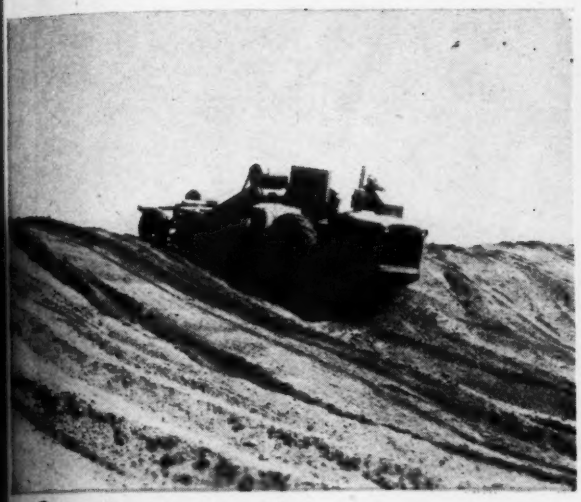
If you have material stockpile problems . . . coal, cinder, crushed stone ballast or other scraper materials . . . here is a handy rig to move materials anywhere around shops in yards or along the line.

LETOURNEAU LET EQUIPMENT

For complete information on this one-man maintenance gang see your Le Tourneau Distributor NOW.

NEW D TOURNAPULL

maintenance handyman



Gravel pit operation

Rig strips, loads, hauls and spreads from nearby pits. One man handles entire operation. Ideal for graveling shoulders along main line and spur tracks. Will handle distribution of road ballast from stockpile.

Crossing & between-track maintenance

Grade and gravel with one man and one tool. Do more jobs per day with less cost per job. Works in yard, on mainline, or side track. Fixes the bad spots quick, can come back later for finishing up.

Erosion control

This versatile off-track dirtmover removes slides, fills washouts, widens embankments, cleans drainage ditches. Goes in where trucks would stall. Travels roads or right-of-way, crosses track at will.

Grades for sidings

Gets there, gets through, and moves on in a hurry. Ideal for getting prompt rail service in, where a small amount of grading is required. Handles complete excavating job . . . grade, drain and ballast spreading.

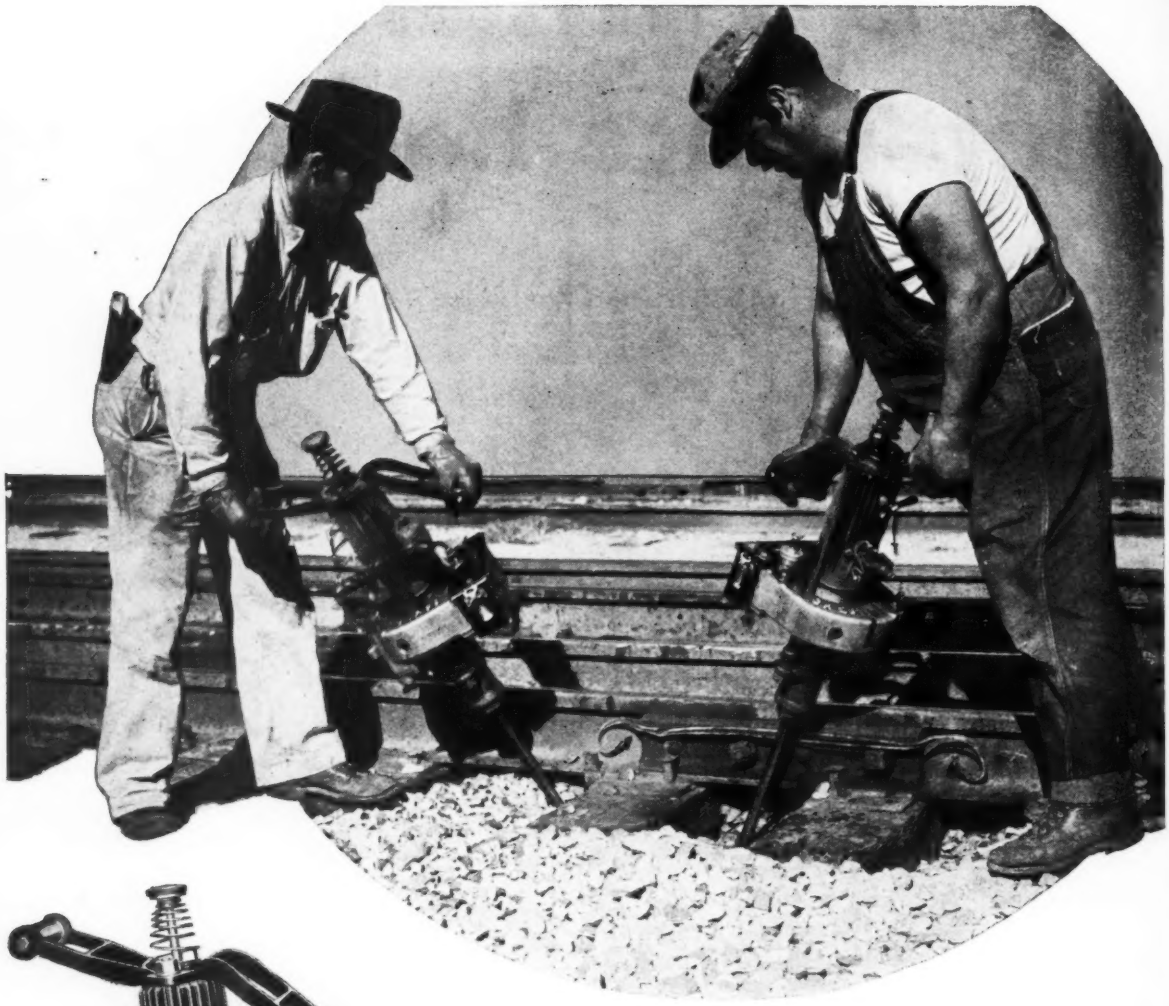
LETOURNEAU
PEORIA, ILLINOIS

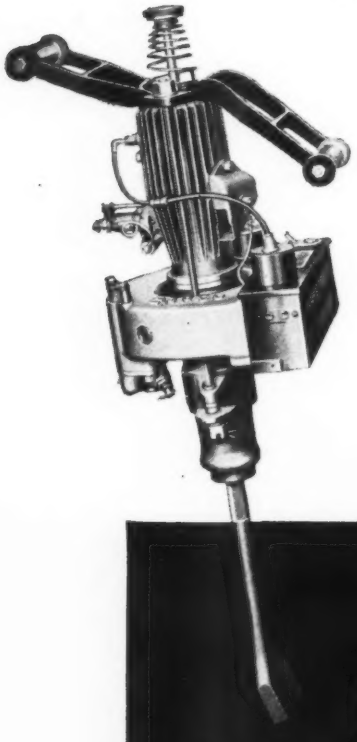
JOB-PROVED Over 5210 Built and Shipped

TOURNAPULLS

Tournapulls, Carryall—Trademarks Reg. U.S. Pat. Off.

FOR LOWEST NET COST PER YARD



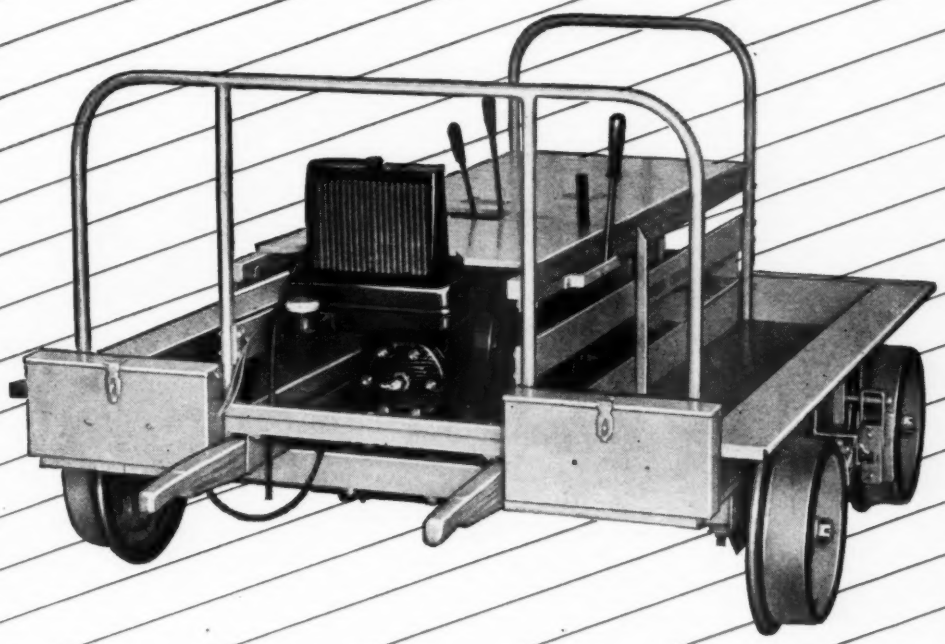


Better Track at Lower Cost

Barco Unit Tytampers mean better track because they do longer-lasting and more uniform tamping—at lower cost. *It takes time to prove the success of a tytamper,* and today Barco is backed up by 10 years of proven superiority. Each of the thousands of Barcos now in operation is painstakingly built with just the right amount of weight, no more, no less, to permit maximum impact *without* increasing pressure by the operator. Write for further information to Barco Manufacturing Company, Not Inc., 1805 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

BARCO
UNIT TYTAMPERS

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY



IT'S LIGHT, IT'S FAST, IT'S SAFE

Fairbanks-Morse 55D Motor Car

Yes, this versatile motor car has a combination of features that add up to real serviceability.

One man can handle it easily. While it weighs 690 lbs., rear lifting weight is only 95 lbs. Yet it is amply roomy and powerful for 8 men and their tools.

It has steel rail skids, alloy steel frame, all-steel battery and tool box. Five-gallon fuel tank supplies powerful 9-hp, water-cooled, single-cylinder engine. Low center of gravity gives maximum safety.

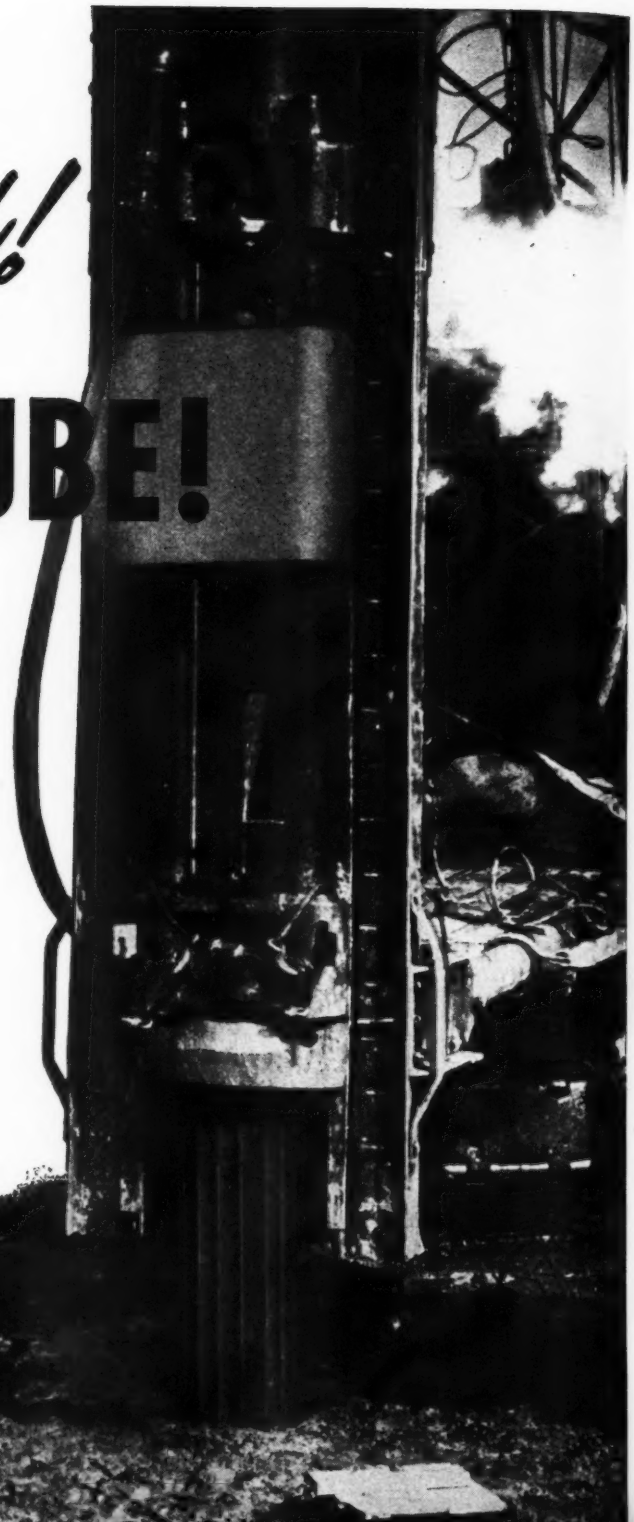
Write today for full information about this and other motor cars in the complete Fairbanks-Morse line. Fairbanks, Morse & Co., Chicago 5, Illinois.

Fairbanks-Morse

A name worth remembering

Diesel Locomotives
Diesel Engines
Generators • Motors
Pumps • Scales
Magnetos • Stokers
Railroad Motor Cars
and Standpipes
Farm Equipment

Down to earth and *in for good!* MONOTUBE!



TAPERED steel Monotube piles are the choice of experienced engineers and contractors time after time—job after job. That's because Monotubes have a *combination* of advantages that mean down-to-earth economy and efficiency.

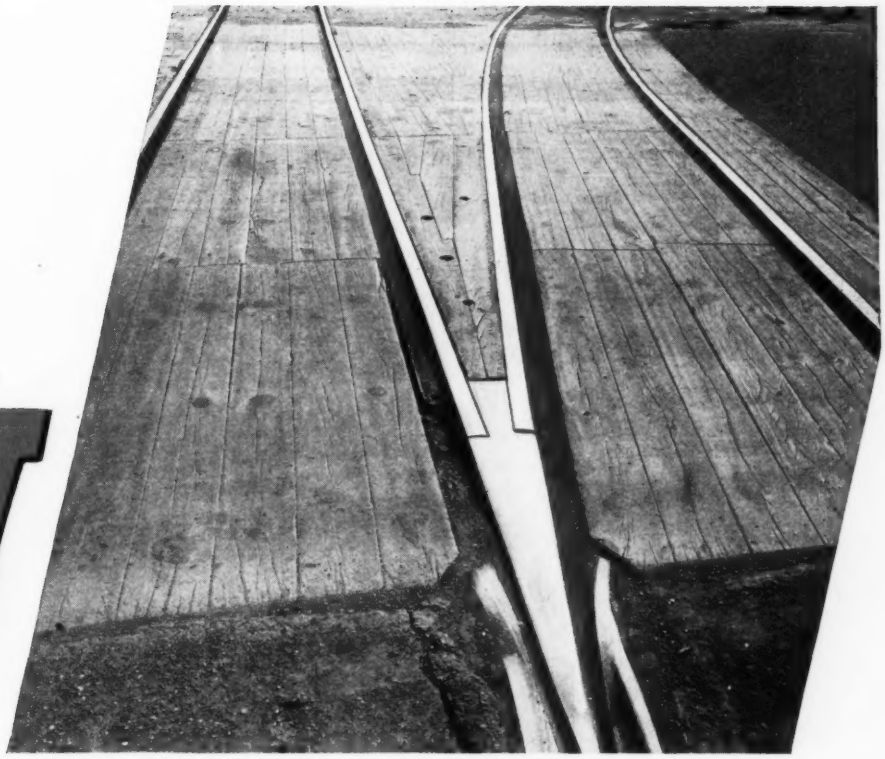
Check over these features—features that bring savings in time and money in constructing foundations for buildings, bridges, piers, airports, highways: Monotubes' fluted, tapered construction permits faster driving with average job equipment; Monotubes are easily extendible to any required length, right on the job; Monotubes are easy to handle, light in weight; Monotubes' tubular design permits quick checking top to toe, before concreting.

Monotubes' many advantages can help get your construction jobs—large or small—started *right.* Available in gauge, size, and taper to meet varying soil conditions. For complete information, write The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL

Monotube Foundation Piles

For additional information, use postcard, pages 645-646



What do you require of your GRADE CROSSINGS?

While there is considerable difference of opinion among railroad men as to crossing details, most will agree in requiring a smooth surface, long life, and long-term economy of maintenance. Match your ideas against the following, which is a partial list of Moss Crossing characteristics:

MTC DURABLE — Many crossings in service 16 years with no apparent deterioration.

MTC SMOOTH — The width of the assembled sections makes for a very smooth surface.

MTC SHIPPED READY TO INSTALL — No cutting and fitting on the job.

MTC BUILT FOR HEAVY DUTY — Moss crossings are as rugged as the track.

MTC VERSATILE — Pre-framed for single or multiple, tangent or curved track. Adapted to crossings through railroad turnouts. Equally suitable whether crossing is at 90° or 30° angle with track.

and remember, they're available NOW!

CROSS TIES
SWITCH TIES
POLES & POSTS
PILING
CROSSINGS

T. J. MOSS TIE COMPANY

The Stamp of Character MTC

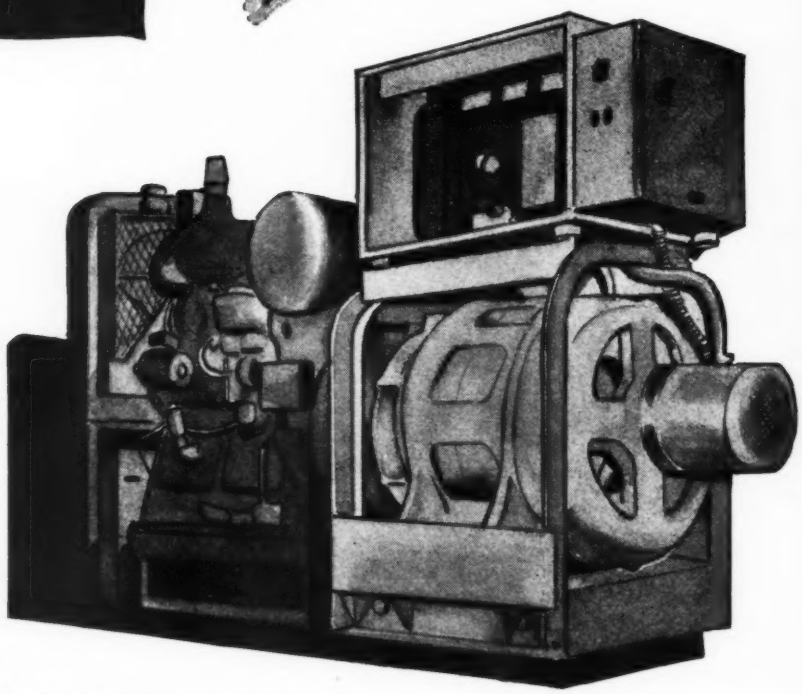
FOUNDED 1878

700 SECURITY BUILDING ST. LOUIS, MISSOURI

WOOD PRESERVING PLANTS
MT. VERNON, ILL.
EAST ST. LOUIS, ILL.
GRANVILLE, WIS.
SHREVEPORT, LA.
COLUMBUS, MISS.

ELECTRIC GENERATOR SETS

25KVA



now offered on

COMPETITIVE SEALED BID SALE

BASE MOUNTED AND TRAILER MOUNTED

These are single-phase, 60 cycle, 120 volt, 900 R.P.M. generator sets. Power-full, long-lived, these units are ideal as stand-by power wherever continuity of power is a necessity. They are gasoline engine driven but are readily adaptable to operation on natural gas.

Here are the power plants for service in construction camps—gas and oil drilling units—mining locations—logging camps—and as stand-by units in industry.

The inventory is located in Baltimore where arrangements may be made for inspection. For full information concerning this sale and complete data on available generators, write to the Baltimore or Richmond Regional Offices, or visit your nearest Customer Service Center.

EXPORTERS:

Your business is solicited. Much material which is surplus in the United States is urgently needed or is readily salable in other countries. Watch for other offerings; many of them may be of interest to your clients.

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT SURPLUS WAA

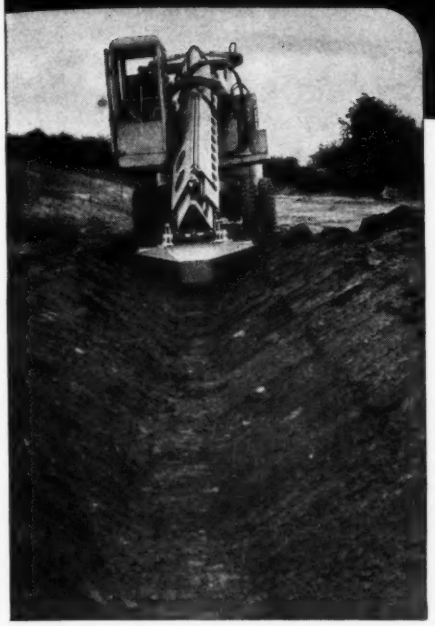
Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago Cincinnati • Cleveland • Denver • Detroit • Grand Prairie, Tex. • Helena • Houston Jacksonville • Kansas City, Mo. • Little Rock, • Los Angeles • Louisville • Minneapolis Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa 1243

For additional information, use postcard, pages 645-646

THE *New* GRADALL

One machine

THAT DOES THE WORK OF *Many . . .*

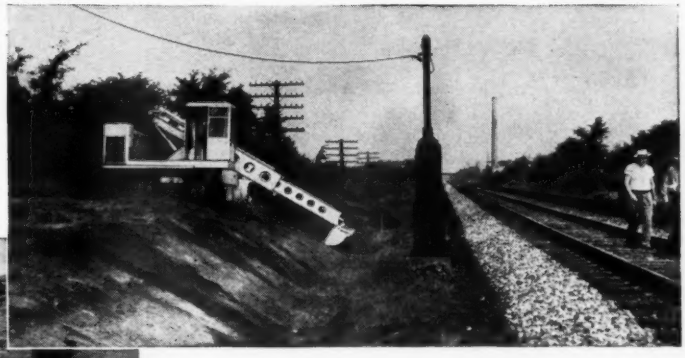


SECRET OF GRADALL'S ABILITY to do fast, accurate work on a wide variety of jobs is a unique, new application of hydraulic power. The sturdy Gradall boom works with "Arm-Action". It reaches and pulls, turns and tilts—cuts sheer, clean walls or perfectly graded slopes.

In many cases, Gradall eliminates the necessity for investing in several different types of costly machinery. Mounted on a heavy-duty chassis, Gradall can be driven from job to job at truck speed.

Investigate Gradall—learn how it can do better work at lower cost for you.

GRADALL PRECISION results in clean, neat ditches like this one. Perfect drainage and free water flow is assured by Gradall's accurate grading of ditch sides and bottom.



GRADALL DEXTERITY makes possible working in close quarters—under low-hanging wires, against walls and curbing, or around switch and signal control boxes.

GRADALL VERSATILITY makes it a truly multi-purpose machine. Here is accurate, clean-cut work in ripping up old paving, which can be neatly stacked, or loaded directly into trucks. No costly clean-up labor is necessary with Gradall on the job.

Gradall Reg. U. S. Pat. Off.

• **SEND FOR GRADALL BOOKLET**

showing many job applications, specifications, complete facts.

GRADALL DIVISION

WARNER & SWASEY

Cleveland

WARNER & SWASEY COMPANY
Cleveland 3, Ohio

Please send the new GRADALL Book to:

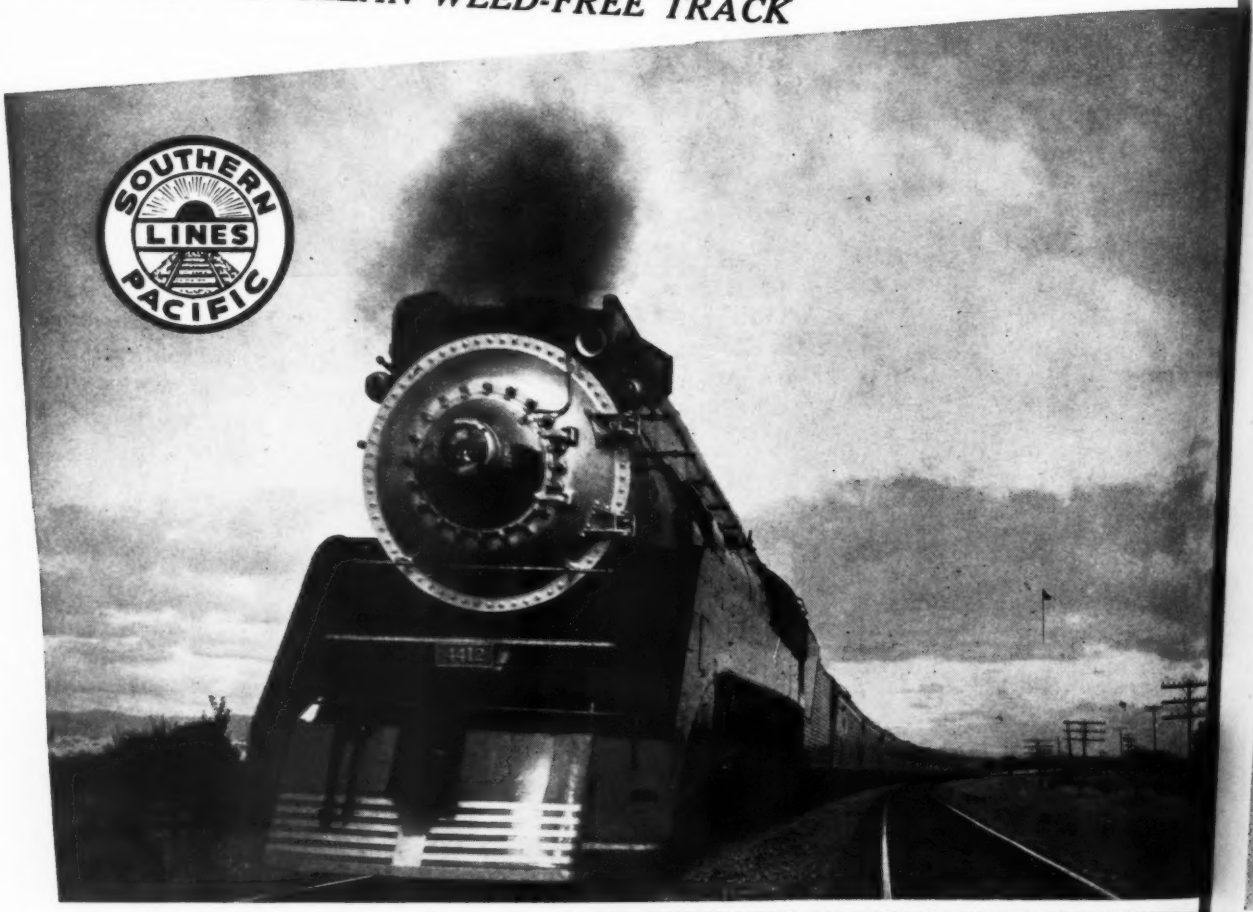
Name .....

Address .....

City ..... *State* N-747

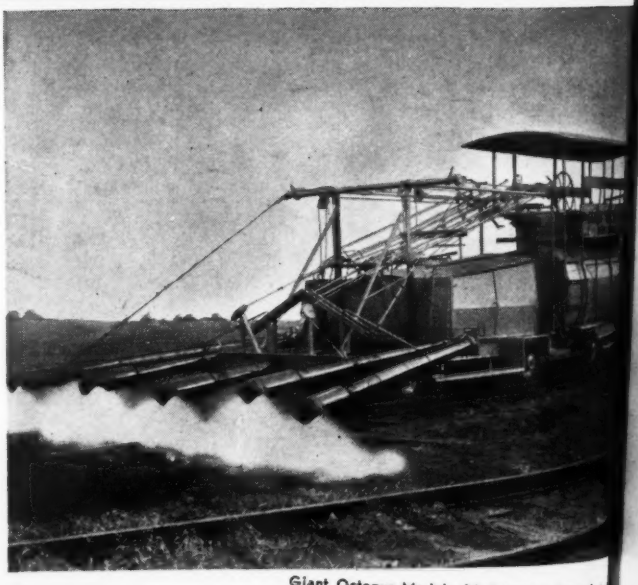
MODERN TRAINS

RUN BEST ON CLEAN WEED-FREE TRACK



Modern trains, such as the Southern Pacific's "Daylight," operate to the greatest advantage of the railroad and the customer when the roadway is well kept, weed-free. Drainage is improved and better maintained track is possible.

WOOLERY WEED BURNERS, by the hundreds, are at work effectively destroying undesirable roadbed vegetation for over 75 up-to-date railroads. Coming in five different models, there is a WOOLERY WEED BURNER available for every weed condition.



Giant Octopus Model with 5 burners for main tr

WOOLERY RAILWAY MAINTENANCE EQUIPMENT

Weed Burners **Tie Cutters** **Creosote Sprayers**

Woolery Weed Burners are available in 5-burner, 3-burner, 2-burner and 1-burner models.

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

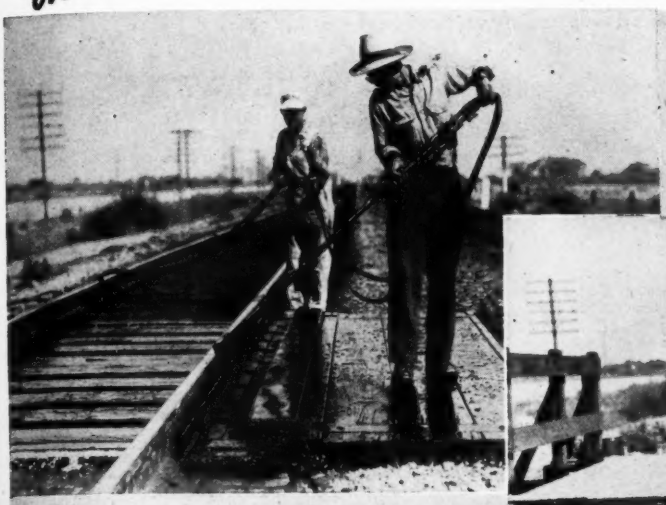
RAILWAY MAINTENANCE EQUIPMENT

RAILWAY WEED BURNERS • MOTOR CARS • TIE CUTTERS • TIE SCORING MACHINES • RAIL JOINT OILERS • CREOSOTE SPRAYERS • BOLT TIGHTENERS

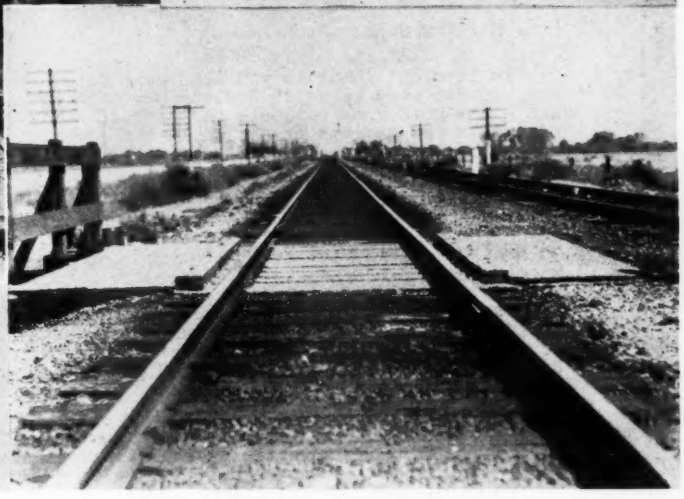
EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., PITTSBURGH, PENNA.

Prevent fire hazards on bridges with the

LIBBEY-ZONE PROCESS



⬅ **Left: "Zone" Primer being applied between sidewalk and guard-rail under sixty pounds of pressure.**



➡ **Right: Same scene 45 minutes later, showing "Zone" Heavy-Duty Coating neatly laid and job completed.**

From main line to shunting trestle, every open-deck timber bridge presents its own fire hazard. Brake shoe sparks, lighted cigarettes tossed by careless smokers, drippings of molten metal from overheated shoes, oil, coal, and other fuel dropped from locomotive boxes... all these elements find a hungry target in unprotected surfaces where ordinary coatings have worn down and cracked to expose splintered wood.

Leading Railroads* are now restricting fires with the LIBBEY-ZONE PROCESS using Heavy-Duty Coating... the revolutionary scientific discovery that combines genuine Canadian ASBESTOS FIBRE with intensified elastic ASPHALT GUM to produce a LONG-LASTING, ECONOMICAL, GENUINELY FIRE-RETARDANT SURFACE for open-deck bridges and trestles.

**Names of Railroads upon application*

"ZONE" HEAVY-DUTY COATING, when combined with the proper aggregate of crushed stone or gravel, expands with heat... yet does not melt; contracts with cold... yet does not flake! Laid thickly, the compound's resilient protective coating stretches over cracks and sinks into low spots, yet maintains an even spread and holds aggregate firmly in place when cold. "ZONE" HEAVY-DUTY COATING is easily and quickly applied and has nationwide distribution. Investigate the money-saving advantages of

ZONE *HEAVY DUTY COATING*

THE ZONE COMPANY

Division of
SOUTHWESTERN PETROLEUM CO., INC.
Fort Worth, Texas

ZONE *Heavy-Duty Coating... for fire retardant protection*

No. 223 of a Series

Railway
Engineering and Maintenance
SIMMONS-BOARDMAN PUBLISHING CORPORATION

105 WEST ADAMS ST.
CHICAGO 3, ILL.

Subject: Your Advertising

July 1, 1947

Dear Railway Supply Readers:

Is it significant to you that ever since we started running a products insert and request post cards in Railway Engineering and Maintenance in February, each month the number of requests for additional information concerning equipment, materials and devices presented in the advertising pages have far out-stripped the number based on the editorial pages? We think it should be. Here are the figures.

While 17 per cent of the requests elicited by the February issue were based on editorial pages, 83 per cent were tied specifically to advertising pages; in March the percentages were 20 per cent and 80 per cent, respectively; in April, 10 and 90; and in May, the last month for which complete figures are available, 75 per cent of the requests referred to products featured in advertising pages. For the four months as a whole, 83 per cent of all requests for additional information were based on the advertising pages, and 17 per cent on the editorial pages. Furthermore, the list of those making requests, based on both advertising and editorial pages, includes the names of engineering and maintenance officers from chief engineers down. And from 95 to 100 per cent of the inquirers each month have a direct or indirect influence upon the purchases made on their respective roads.

What do these facts mean to you? Unmistakably, they should mean at least two things—first, your advertising in Railway Engineering and Maintenance is read carefully, and second, it is read by officers of supervisory rank, who are in responsible charge of maintenance operations and in a position to influence the purchases of the materials and equipment used in carrying out those operations.

Do they indicate that the editorial pages have less readership than the advertising pages? Certainly not. We have too much evidence to the contrary to give that a moment's thought. But, they could, and no doubt do, indicate one other fact that should be of interest to you. Whereas the reader gets most of the essential facts he requires from the editorial pages—which is a source of keen satisfaction to us editors—he too often does not get all the facts he would like from the advertising pages. Thus, satisfying as the readership of the advertising pages of Maintenance may be, there are indications that some of the presentations in these pages are inadequate in scope and in informative material to do the job required.

If this could be said about the editorial pages, we editors would be deeply concerned. Perhaps it is not as serious a matter in the case of the advertising pages, especially where a product or company is well known. However, especially when introducing new products, would it not appear the part of wisdom for the advertiser to adopt the policy of the editorial pages, and attempt to give the reader—his prospective customer—the most complete and helpful information possible?

Sincerely,

Neal D. Howard

NDH:jb

Editor

Men and Machines MAKE PERFORMANCE ON THE JOB COUNT

Inspection Party—Sincerity of purpose, foresightedness an practiced good judgment . . . these are the attributes found i the makeup of those men charged with the responsibility of th final "say-so" of railroad operation.

HARNESSED power on driving wheels speeds over the rails carrying passengers comfortably and safely to their destination. Fast freights on precision schedules carry products of a nation. All this requires eternal vigilance on the part of the entire operating staff.

Alert management is always vitally concerned with the safe, efficient, economical movement of both passengers and freight. So important is this task of construction and maintenance that railway officials make frequent line trips for visual check of the intimate and vital elements of railroading. For years Fairmonts have served this exacting purpose with dependable satisfaction.

FAIRMONT RAILWAY MOTORS, INCORPORATED
Fairmont, Minnesota

Fairmont Motor Cars

Dependable Transportation Alway

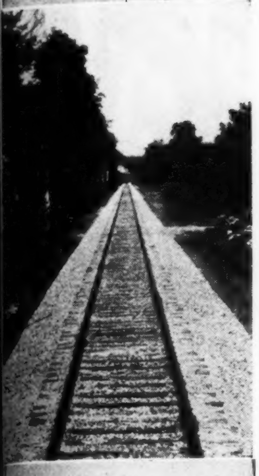
Fairmont

RAILWAY MOTOR CARS

Performance ON THE JOB COUNTS

OF ALL THE CARS IN SERVICE TODAY MORE THAN HALF ARE FAIRMONTS

Fairmont S2 Series H. endless Cord belt and Fairmont 8-13 H. safely enclosed engi Weatherseald Timer Condenser Cooling incl ed as regular equipm Carries 8 men.



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Subscription price in the United States and Possessions and Canada, 1 year $2, 2 years $3; other countries in Western Hemisphere, 1 year $5, 2 years $8; all other countries, 1 year $7, 2 years $12. Single copies, 50 cents each. Address H. E. McCandless, Circulation Manager, 30 Church Street, New York 7, N.Y.

Member of the Associated Business Papers (A.B.P.) and of the Audit Bureau of Circulations (A.B.C.)

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Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

JULY, 1947

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Associate Editor

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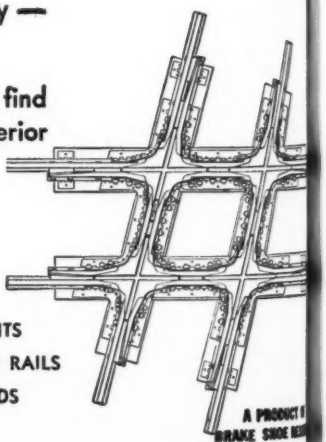

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Railway Engineering and Maintenance

Train Accidents—

Record Not So Bad As Portrayed, But Needs Improvement

The public is justly concerned about transportation accidents—in any form of transportation, and of any character that jeopardize life and limb. Earlier this year, as the result of a series of misfortunes, the railways were in the spotlight. More recently, airway accidents have filled the headlines, and have caused public concern. Unquestionably, there have been far too many in both forms of transportation, despite efforts to avoid them. Nearly every accident is proof again that in modern transportation there is no room for inferior or faulty materials, inferior or faulty equipment, carelessness, inattention to details, or complacency.

But in the unfavorable publicity that has been given the railroads in recent months, how justified have been some of the vitriolic attacks made on them by certain writers and commentators? One widely-read, usually factual columnist wrote of railroad men recently as having lost a grip on conditions in their industry, requiring that Congress investigate and find out what's wrong. He and others have slapped at the advanced age of men operating trains, the condition of equipment, and the high speed at which some trains are run, "contrary to the desires and safety of many travellers." Other criticism has been directed specifically at the track structure, either stating or inferring that, generally, ties are rotten, spikes are loose, and the rails in a hazardous condition.

Happily for these critics they do not present railroad accident statistics to substantiate their assertions, and make no comparison of current railroad accidents with those in certain other forms of public and private transportation. To do so would refute most of their innuendoes, and, except for the general thesis that there are still too many accidents, and room for improvement, would make them appear biased and unfair. An unfortunate aspect of the situation is, however, that the accident record of the railroads in recent years is not as favorable as it might have been, and to that extent is embarrassing and calls for careful consideration by railway managements and employees of all the factors involved.

Records of passenger train accidents and fatalities to passengers on trains show that the number of train accidents actually decreased in 1946 compared with 1945, and that the number was far less in 1946 than in 1925—in the early years of the nation-wide safety campaign initiated by the railroads. On the basis of train accidents per million locomotive or motor-train miles, the record in 1946 was somewhat higher than in the earlier Forties (9.67 compared with rates of 5.43 to 9.63) but it was considerably better than that for 1925 (11.87), and far better than the figure for 1920 (19.70).

As to the number of passengers killed per 100 million passenger-miles as the result of train accidents, the record for 1946 was worse than in 1945 (0.10, compared with 0.07), but was better than in 1944 (0.19), 1943 (0.23), and 1940 (0.28), and was far better than in 1925 (0.23), and 1920 (0.16), when speeds were slower and equipment heavier. As to injuries in train accidents, the record of 2.44 per 100 million passenger-miles in 1946 was slightly higher than that in 1945, 1944, and 1942, but was lower than in other years of the Forties, and compares with a record of 5.69 in 1925 and 8.97 in 1920.

Detailed figures as to the number of train accidents in 1946 due to defects in or improper maintenance of way and structures are not available, but those for the years 1940 to 1945 would, unfortunately, tend to substantiate criticism of the maintenance of way and structures department —the record showing a steady increase in the number of such accidents

from 774 in the earlier year to 2,368 in 1945. However, it should be noticed that even the high figure in 1945 is small compared with the 3,263 such accidents in 1925, and the 5,549 which occurred in 1920.

No one contends that the railroads—after four years of war load, prolonged shortages in nearly everything they need, continuing peak traffic since the war, and with far less than adequate earnings to make improvements and effect a super standard of maintenance—are all that they should be physically. No one knows this better than the roads themselves. However, in the face of the difficulties that have confronted them and their relatively favorable record of passenger deaths per 100 million passenger-miles in comparison with the records of the air lines, the bus lines and private automobiles, every railroad employee should resent unjustified slurs on the safety record of his industry. At the same time, along with management, they should resolve anew, with increased determination, to cut all kinds of accidents, from whatever cause, to the absolute minimum.

Modernizing Stations—

The Importance of Doing a Good Job

IN RECENT years many old and unsightly railroad passenger stations have been remodeled and redecorated to bring them up-to-date. Such work is highly commendable and should be continued, for one of the best local advertisements for a railroad is a neat and attractive station of which the community and the carrier can be proud.

However, the money spent in this work might as well be poured down the drain if, because of hasty planning, "cutting corners", and injudicious choice of materials, the renovated station quickly deteriorates and becomes shoddy again in a relatively few years. Hence, the work should be so planned, including careful attention to the matter of choosing the finishing materials, as to secure a remodeled structure of maximum permanence and durability, and one that will be economical to maintain and keep clean.

Another important consideration is the necessity of doing a thorough job if the remodeled structure is to give complete satisfaction. For instance, the beneficial effects of modernizing a station will be at least partly nullified if, to save cost of additional wiring, existing drop lights are merely replaced with similar fixtures of later design, rather than installing one of the newer forms of lighting. A similar unfavorable effect will be created if, for example, in the face of an otherwise thorough job, an existing wood floor is allowed to remain as the wearing surface without at least being sanded and refinished.

Elsewhere in this issue is an article describing the modernization of the station of the Chicago, Burlington & Quincy at Dubuque, Iowa, in which an exceedingly thorough job was done. These improvements might well be studied by others interested in station modernization, particularly with regard to the completeness of the work and the durability of the materials used, After all, fulfilment of the adage "a penny saved is a penny earned" does not necessarily require that the saving be made now; possibly the largest savings can be made in the future through reduced maintenance and the elimination of costly replacements.

Criticism—

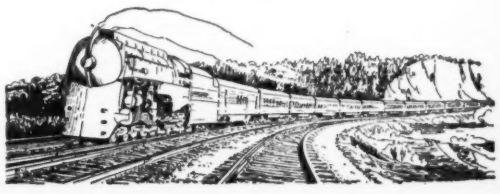
How to Avoid Being the Recipient

THERE are many maintenance supervisory officers throughout the country—track supervisors, roadmasters, bridge and building supervisors, and division engineers—who dread having their territorials visited by the so-called "brass hats", especially the higher-ups in their own department. This dread has its origin mostly in the fact that frequently during such visits the supervisor (or other local officer) is made the object of severe criticism, and nobody enjoys being "put on the spot," especially before his associates or others.

It cannot be denied that a great deal of the criticism that is frequently so generously forthcoming on such occasions is unfair or unjustified, and to the extent that this is true there isn't much that the supervisor can do except to "grin and bear it". On the other hand, how frequently would an unbiased observer say that the criticism *was* justified and that the supervisor was being placed "behind the eight ball" for reasons lying mostly within himself, and which are, therefore, under his control? No one is in any better position to answer this question than the supervisor himself, although it will not be easy for him to adopt the coldly impartial attitude that is necessary before the situation can be seen in its true perspective. To achieve such an attitude it may be helpful to raise a number of questions in one's own mind, such as:

"Am I alert at all times to the condition and requirements of my territory? Am I trying to handle these requirements as they arise from day to day or am I planning ahead in order to anticipate them? Am I exercising the proper supervision over my gangs to make certain that all work is being done properly, down to the last detail? Am I relying too strongly on the assumption that my foremen or other subordinates will do what is necessary without being told? Am I exercising the proper latitude in making decisions without waiting for my superiors to make them for me?"

The answer to these, and similar, questions will determine whether or not a supervisor is doing somewhat less than his best or whether he is "on top" of his job at all times. If the latter situation prevails, the supervisor, rather than dreading to have his territory inspected by his superiors, is more likely to look forward to such an occurrence as an opportunity to demonstrate his competence and the firm control he has over his job and responsibilities.



Oxyacetylene Strip Welding on the New Haven—Note the Crawler Tractor Gas Cylinder Carriers in the Background

(All photos courtesy the New Haven Railroad)

Nine Years of Strip Welding on the New Haven

After a brief review of building up battered rail ends on his road, including early experiences with strip welding, the author cites the advantages of such welding as he sees them and tells of the smaller welding gangs now being used. He also describes a lightweight electric grinder, an electric slotter, a tractor cylinder carriage, a rail grinder to remove corrugations, and a cutting-torch weld surfacer.

By COL. A. L. BARTLETT

Engineer, Maintenance of Way
New York, New Haven & Hartford
New Haven, Conn.

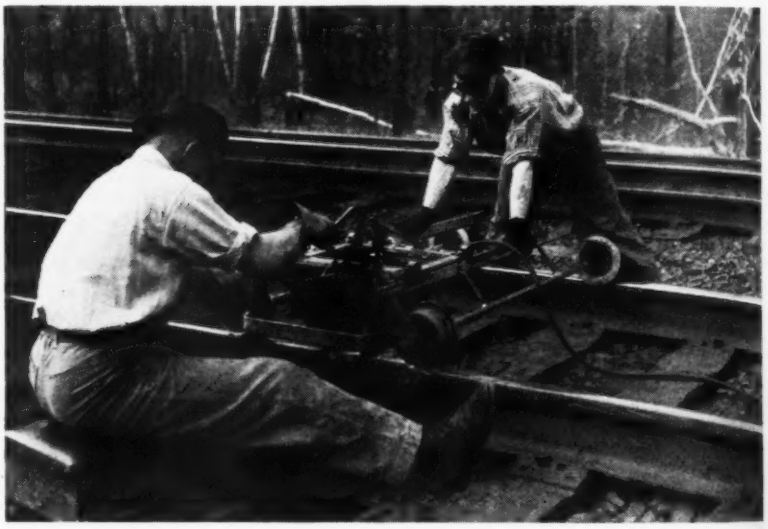
IN COMMON with many railroads, the New York, New Haven & Hartford, in the late Twenties, adopted the oxy-acetylene process of repairing battered rail ends. Until the late Thirties, it was the practice on this road to build up the battered surface throughout the full width of the ball of the rail, alternately welding and hammering successive patches of the battered zone until the entire battered surface had been built up; then surface grinding so that the contour of the repaired area corresponded with the general contour of the adjacent unwelded rail tread to produce a smooth riding joint; and, finally, slotting or cross-grinding the ends of the rails.

During 1936 and 1937 a modification of the above procedure was tested extensively by the New Haven and was adopted as its standard practice in 1938. The distinguishing feature of this method as now used is that welding is confined to a strip about 1 to 1¼ in. wide located on the "riding strip" approximately in the center of the ball of the rail. In addition to the substantial saving in time, labor and materials inherent in the process, the "strip weld" is tough and particularly resistant to the battering of locomotive and car wheels.

Improved Properties

The improved physical properties of the strip weld are accounted for by the controlled "heating treatment" inherent in the method of applying the weld metal. The rate of welding is about twice, and the heat input about half, that of full-ball welding. Moreover, the heat input is controlled by such easily controlled factors as the width of the strip, the size of the blow-pipe used and the rate of welding. Consequently, the rate of cooling and the resulting hardness are controlled to produce a weld of any desired hardness and toughness, including the preferred hardness in the range of 350-400 Brinell required to successfully resist batter.

It had been our experience with full-ball welds that unless heat treated, or less than about 2½ in. long, the important end zone within an inch of the rail end, where batter starts, was, as a rule, not much if any harder than the original rail metal, owing to the excessive heat-



Above—Close-Up of One of the Tractor Cylinder Carriers, Showing the Arrangement of the Cylinders. Right—One of the Recently-Developed Light-Weight, Electric Surface Grinders Used With the Small Strip-Welding Gangs on the New Haven

ing and slow rate of cooling. Strip welds, on the other hand, with correct procedure, possess the above-mentioned preferred hardness throughout, including the extreme end zone, irrespective of the length of the weld, and successfully resist batter. The relatively soft end zone of full-ball welds as we used to make them tended to "mushroom" and form a projecting lip after a few months of service, even when slotted. A recent inspection of a 15-mi. stretch of strip welds, built up by one of our eight-welder gangs in 1937, revealed no appreciable batter, and the ends appeared as square as though newly slotted.

Other Advantages

Other advantages of strip welding are that it is simpler to perform than full-ball welding and requires no different apparatus or materials. Moreover, the surface grinding and slotting of strip welds is much simpler and faster than that required for full-ball welds. Another important advantage is the protection afforded to signal bonds of the types that are applied to the head of the rail. Formerly, a bonding gang accompanied the eight-welder gang because of the necessity of replacing about 30 per cent of the bonds damaged or loosened by full-ball welding. Bonds bronze-welded to the head of the rail are unaffected by strip welding, and plug bonds in the head are effectually protected by encasing them in a handful of asbestos paste, which is reclaimed and used again.

Strip welding was more completely described by the writer in the April, 1941, issue of *Railway Engineering and Maintenance*, in connection with its use by the eight-welder gangs then employed on the New Haven. It is understood that since then several other Class I railroads have adopted this method of welding as standard practice, some employing the gas process and others arc welding.

Small Gangs Developed

During the past five years, as the result of considerable research, certain changes have been made in the New Haven's gang organization and equipment for repairing rail ends. It is realized that each railroad and, in fact, each division and sometimes each section, has its own conditions and special problems, and that the methods or organizations used successfully on one may not meet the requirements of another. Thus, the large, eight-welder gang employing heavy-duty surface grinders, although recognized as generally efficient and economical insofar as the cost of the operation is concerned, nevertheless has certain disadvantages in operating under the conditions of traffic prevailing over most of the New Haven. To meet these conditions we are now employing small two and three-welder gangs equipped with light surface grinders. These gangs operate under traffic, without slow orders, with reasonable efficiency.

In our experience, the two or three-welder gang, employed practically throughout the year in its home district, has numerous advantages over the eight-welder gang employed seasonally and covering a larger territory. Among the disadvantages of our former large, seasonal gangs were the labor turnover, the greater frequency of breaking in and training operatives, and the difficulties attendant upon the handling of these large gangs under heavy traffic.

Developed Small Grinder

Although the heavy-duty, gas-engine-driven surface grinder, capable of surface grinding the output of about four welders, depending on the length of the joint, is admittedly more efficient than the smaller, gas-engine-driven grinder which we adopted about five years ago, yet the latter had such great advantages for our frequency of traffic that we have developed an even lighter grinder,

weighing less than 200 lbs., with electric-motor drive, even though it requires two such grinders for each small gang. The new electric grinder has been adopted for two of our gangs and its use is being extended this year.

Tractor Cylinder Carriage

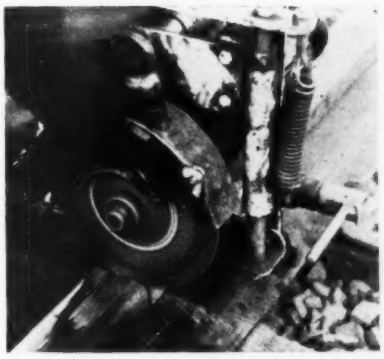
Another development on the New Haven is a crawler tractor of special construction for carrying the entire gas cylinder supply for two welders for one day—four acetylene and two oxygen cylinders. The acetylene cylinders are carried in a compartment capable of being warmed by the exhaust gas from the tractor engine. The tractor operates off-track, in the clear, occasionally traveling across track. It operates on fills, but for some cuts the gas cylinders are placed in "set-ups" along the track, in the clear, in the former manner.

This outfit operated with complete success all last year and through the past winter, along our Shore Line, under severe cold and wind conditions. Similiar tractors have been constructed for additional gangs. The success of this tractor outfit, with its solution of the very great problem of handling gas cylinders, constitutes an additional reason for favoring the use of the small gang, to which it is especially adapted.

Although heretofore employing a gas-engine-driven slotter for cross grinding rail joints, we have procured additional electric-motor-driven slotting machines as the result of our successful experience during the past year with one such machine. This slotter and the electric surface grinder have been supplied with power from a 5,000-watt generator which is mounted on the tractor and driven by a belt from the tractor engine.

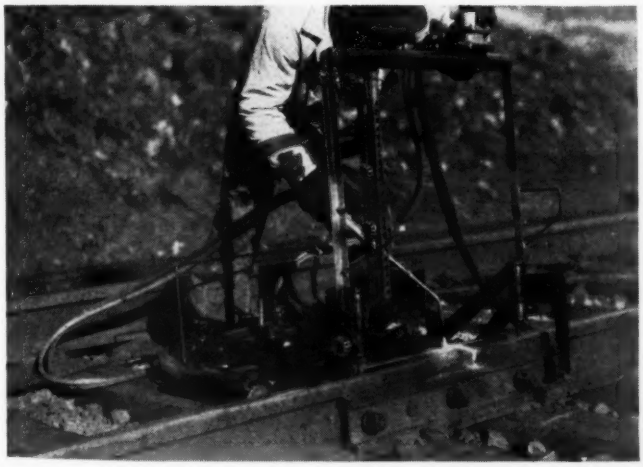
Other Interesting Developments

Two other developments now in progress on the New Haven have interesting possibilities. One of these is a specially constructed electric surface grinder for the purpose of grinding corrugated rail, or general rail surfacing. Following preliminary tests, a larger machine has been constructed. Power furnished by two 5,000-watt generators, belt driven on the tractor, operate four 2½-hp. motors, on each of which is mounted a 6-in. cup wheel, two on each rail. These wheels are offset ¼ in., providing a ground strip ½ in. wide at each pass. The grinder travels 20 ft. per min. and six passes are required to complete the rail surface. Our plan is to follow immediately behind an out-of-face track surfacing gang with the rail surfacing operation.



Cross Grinding the Rail Ends at a Completed Strip Weld With an Electric-Motor-Driven Slotting Machine

The other development is in line with our requirements for a light machine for surfacing strip welds. A novel method of surfacing such welds has been embodied in a machine weighing less than 100 lb. and operated by the welder himself with one helper, using a horizontally-positioned cutting torch on a traveling carriage. Two such machines are now operating under production and it has been found that a joint can be repaired by one welder and a helper, i.e., strip welded and surfaced, in the same time formerly required to strip weld alone. No peening or grinding is required, the weld metal being simply laid on and then cut by torch on the machine to true surface. The new procedure appears to be technically successful and its use is being continued under various track conditions to test it thoroughly.



Above—The Latest Development for Surfacing Strip Welds. Note Hand-Held Preheating Torch Ahead of the Carriage - Mounted Cutting Torch

Right—The Multiple-Head Electric Surface Grinder Developed to Remove Corrugations or for General Rail Surfacing

Small Station Gets C

The Chicago, Burlington & Quincy has transformed its passenger station at Dubuque, Iowa, formerly a drab and unattractive structure with old-fashioned lines, into one that is modern and pleasing in every respect. This work, described in detail in this article, included the complete reconstruction and refinishing of the interior and the streamlining of the exterior, together with certain structural changes that had the effect of making a single building out of the two separate structures, with a common roof, that formerly comprised the station.

MODERN concepts of architectural design have been freely applied in a recent project that involved the rebuilding of the passenger station of the Chicago, Burlington & Quincy at Dubuque, Iowa. Here the original station has undergone not only a "face-lifting" treatment, but a "major operation" as well, which resulted in the transformation of a typical stereotype structure of an outmoded style of architecture into one of distinction, presenting a pleasing appearance both inside and out. At the same time provision was made in the station to accommodate the company's freight office at Dubuque, which was moved from its former location in the freight-house, thereby making additional space available in the latter structure.

An interesting aspect of the Burlington's station at Dubuque is that all passenger traffic at this point is handled with buses. The station is located on the west side of the Mississippi river at the end of a spur which extends across the river to East Dubuque where it connects with the company's main line between Chicago and St. Paul, Minn. Formerly a shuttle train service for passengers was operated across the river to make connections with main-line trains, but some years ago this service was replaced with buses, and today the spur track is used only for freight service.

In the modernization work, the appearance of the exterior was completely transformed by removing the existing high roof, by applying an attractive architectural treatment, and by connecting the station proper to a separate garage building to form a single unit, as will be described later. The interior of the station proper, formerly embodying two separate waiting rooms of equal size, was completely revamped to provide a single waiting room and the freight office, which were then refinished and redecorated in the latest style, as were the ticket office and the toilet rooms, which were rebuilt in their original locations.

Original Facilities

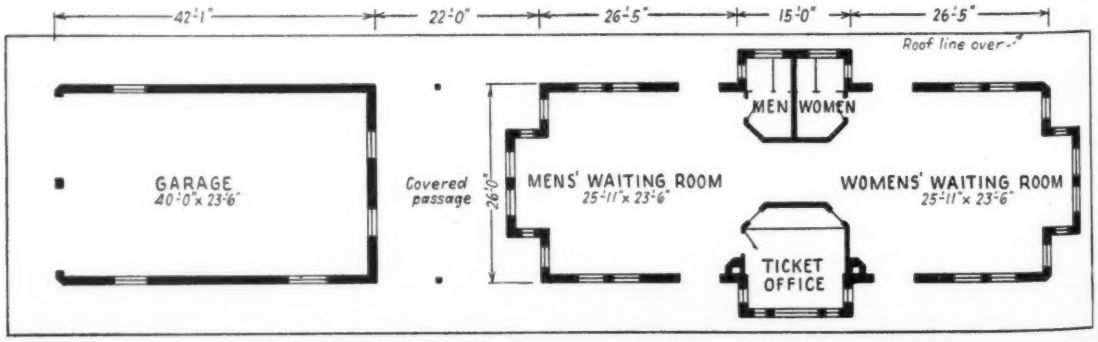
The station at Dubuque was originally built as a two-unit facility consisting of the station building proper, 26 ft. by 68 ft. in plan, lying in a north-south direction parallel with the tracks, and a smaller building, 24 ft. by 26 ft. in plan, placed 40 ft. north of the station, which housed the baggage room. The station proper had a high gable roof—sufficiently high in fact to be equivalent to a second story, although it was not finished on the interior. A somewhat lower gable roof was common to both the baggage building and the open space between the two structures, forming a canopy over the latter. Subsequently, following the inauguration of bus service to East Dubuque, alterations were made to the baggage room by moving the south wall 18 ft. toward the station building, under the existing roof, to provide a 26-ft. by 42-ft. garage for buses. By this extension, the former baggage space was eliminated and the distance between the two buildings was reduced to 22 ft.

Formerly Two Buildings

The two buildings comprising the original station were of brick construction over a full basement under the station proper. The floor plan of the station proper was symmetrical in design, and included a bay window, 4 ft. 6 in. deep, centrally located in each wall. The ticket office was located in the west bay window (track side) and the toilet rooms in the east bay, both projecting somewhat into the interior but separate by a passageway connecting two waiting rooms, one for men and one for women. Four double entrance doors were provided, two on each side, which flanked the bay windows. Both of the buildings forming the original station were heated by steam radiators fed by a hand-fired boiler located in the basement. All lighting was of the incandescent type.

Exterior Changes

Principal elements of the work done on the exterior of the station included the streamlining of the structure, as already indicated, by the removal of the high gable roof and the provision of walls of matching brick, set back one foot for architectural effect, to enclose the space between the original separate buildings. In removing the roof the walls were cut down to a height of 18 ft. 6 in. above the ground and a flat roof was constructed over



Before—As Shown in this Floor Plan the Facilities Consisted Originally of Two Separate Buildings

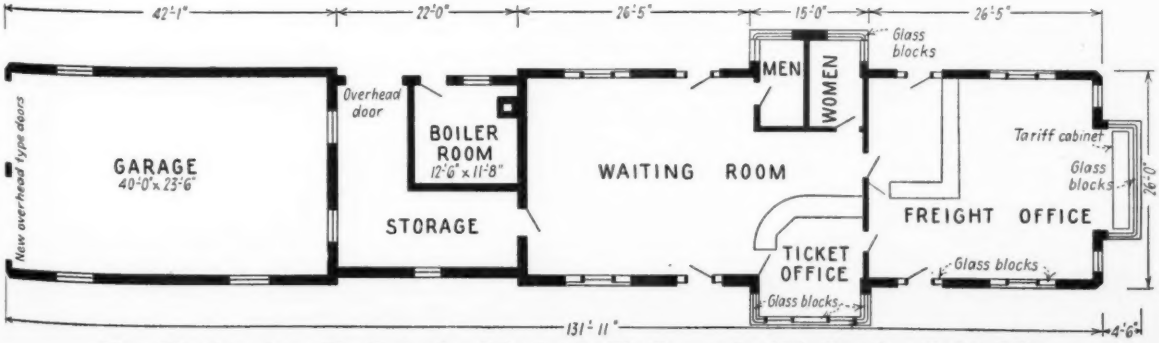
Complete "Going Over"

The Exterior of the Station Emphasizes Modern Lines and Materials

the entire building. The side walls terminate in a parapet which was topped with a 4-in. stone coping. From the coping to the tops of the doors and windows, 10 ft. above floor level, the exterior walls were faced with Vitrolite glass, those panels over the west bay window being etched with letters forming the word "Dubuque."

The color of the glass facing is peach, while all exterior doors and the wood trim are finished in bronze green. The etched station letters on the glass facing were painted a dark blue to contrast with the peach background. In line with the lower edge of the glass facing, flat cantilever-type canopies were constructed over the three exposed bay windows, with those on the east and west sides being extended somewhat beyond the limits of the windows to provide canopies over the adjacent doors. These canopies have pitch-and-gravel roof surfaces, are faced with Alumilite moulding, and are finished on the undersides with plywood.

The Up-to-Date Treatment and Modern Appointments of the Waiting Room Are Evident from This View, Looking Toward the Ticket Office. Patrons Are Sure to Like the Leather-Upholstered Settees and Chairs, the Decorative Scheme and the Fluorescent Lighting



After—The Open Space Was Enclosed and the Interior Was Revamped to Make Space for a Freight Office

All windows in the east and west walls, formerly arranged in pairs, were removed and each pair was replaced with a single window flanked by panels of Pittsburgh-Corning glass blocks. Likewise, each double entrance door was replaced with a single door with a flanking panel of glass blocks on each side. Each of the three bay windows was given an entirely different treatment, which, as will be seen later, was dictated to a large extent by the requirement of the interior facilities adjacent to them.

Bay Windows

Using the former sills as a base, the walls of the west bay window were built entirely of glass block, except that two windows with conventional sash were provided in the face of this bay. The south bay window was bricked up to a height of 7 ft. above the floor, with the remaining space from this level to the canopy being filled by a horizontal panel of glass block extending around the entire perimeter of the bay. In the east bay, the brick walls were constructed to a height of 6 ft., and above this level two glass-block panels, separated by a brick pilaster, were provided in the face of the bay. A small window with conventional sash was provided in each end wall of this bay. At all locations the glass-block panels have cut-stone sills.

To complete the exterior architectural changes, new overhead doors were installed in the north (garage) end of the building, and a large door opening, also fitted with an overhead door, was inserted in the east wall of the enclosed area between the original buildings. To provide a matching color between the old building and the new masonry, all exposed brick surfaces of the old structure were thoroughly steam cleaned.

In the modernization of the interior, practically all existing facilities were removed and entirely rebuilt. The additional area provided by enclosing the space between the two buildings was divided between a storage room, to be used also as a baggage room, and a boiler room, and for this reason it was possible to fill in the entire basement, which had previously given trouble due to ground water seeping into it. Over the filled-in basement, a concrete slab was placed as a foundation for the interior facilities. Probably the most important step in the structural renovation of the interior was the construction of a transverse partition at the south line of the east and west bay windows, dividing the old station proper into two separate rooms, the space south of this wall being given over to the company's freight office. The space north of the new partition is occupied by the waiting room, together with the reconstructed toilet rooms and the ticket office in their original locations.

In the Freight Office, Showing the Treatment of the Former Double Windows in the Side Walls and of the South Bay Window

The Freight Office

The new freight office is 25 ft. by 23.5 ft. in floor area and is equipped with a built-in counter and tariff cabinet. The interior finish in this office includes asphalt-tile flooring and baseboards, plaster walls and an Audatone ceiling. The tariff cabinet is located in the south bay window, occupying the full width of the space to a height of 7 ft., with the glass-block panels in the outer wall providing light over the top of the cabinet. Constructed of plywood with a natural finish, and equipped with sliding flush doors, the cabinet harmonizes effectively with the modern design. The counter, L-shaped to close off a public space at the entrance door in the east wall and a door into the waiting room, is also constructed of plywood. This facility has a linoleum top and metal edging, and is equipped with flush sliding doors on the agent's side. Of interest is a toe-space provided at the bottom of the counter on each side. A second doorway in the new partition connects the freight office with the ticket office.

Waiting Room

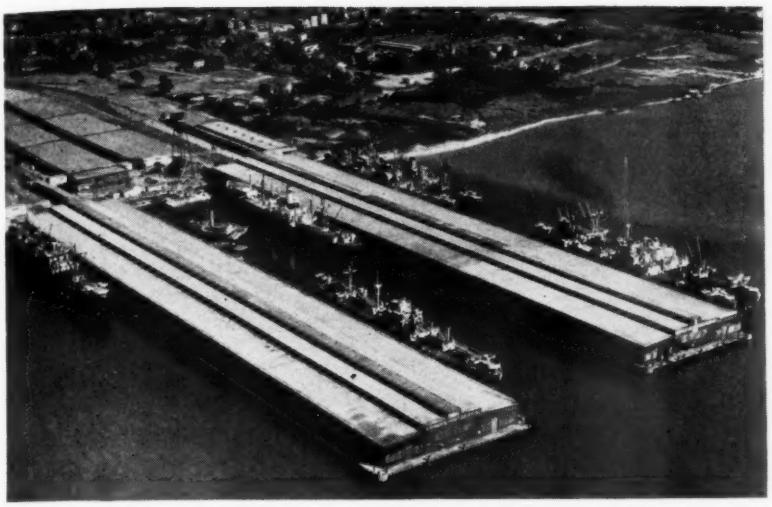
The remodeled waiting room is 25 ft. by 23.5 ft. in plan, not including the passageway between the ticket office and toilet rooms which, as already indicated, remain in their previous locations in the bay windows. The finish in the waiting room includes terrazzo flooring and baseboards, Vitrolite glass wainscot to a height of 3 ft. 6 in., plaster walls and an Acoustone ceiling. The color scheme, based on harmonizing shades, includes a dark floor, black baseboard, beige wainscot, Wellington buff side walls and natural buff ceiling. All interior doors are of the flush type, and these doors, as well as the trim, are in medium oak. In keeping with the modern design, the furnishings in the waiting room include large settees upholstered in imitation leather and several lounge chairs to match. All radiators are provided with covers that are painted to match the interior decoration. An interesting sidelight on the modernization work is that an elaborate trademark of the Chicago, Burlington & Northern, predecessor line of the Burlington and builder of the station, which was found etched in one of the window panes of the old station, was framed and hung on the wall of the waiting room.

Ticket Office

The new ticket office is of interest chiefly because of the fact that it is separated from the waiting room only by a counter surmounted by Louvrex glass panels, 18 in. high, supported between wood posts arranged to form two ticket windows, each enclosed with two hinged sections of the same glass. With the ticket office located in a corner of the waiting room, the counter has two sides at right angles, which are joined by a curved section.

(*Continued on page* 683)

Wrought Iron Fire Curtains for Big Piers



Aerial View of Norfolk & Western's Piers at Lambert Point, Va., Which Have Been Protected Against the Spread of Fire Below Deck by Wrought Iron Fire Walls

STRIKING at what has so often been called the "Achilles heel" of the fire problem in marine piers, the Norfolk & Western recently installed twin wrought iron plate fire walls, supplemented by manually-operated sprinklers, below the decks of two existing piers at Lambert Point, Va.

One of these piers is 1,195 ft. long, 207 ft. wide, and has an 18-ft. apron on each side. It is served by one track on the south apron and two depressed tracks extending through the center of the shed. The other pier is 1,200 ft. long, 207 ft. wide, and has a 7-ft. apron on both sides. Four depressed tracks traverse the center of its shed.

Both piers were built in 1916 on timber piling with 3-in. oak floors over 5-in. by 12-in. joists supported by 12-in. by 12-in. caps. It was recognized at that time that such construction was vulnerable to fire below deck, and concrete fire walls were installed; but severe tidal action, corrosive industrial acids, and salt water rendered several of these walls so useless that replacement was finally necessary.

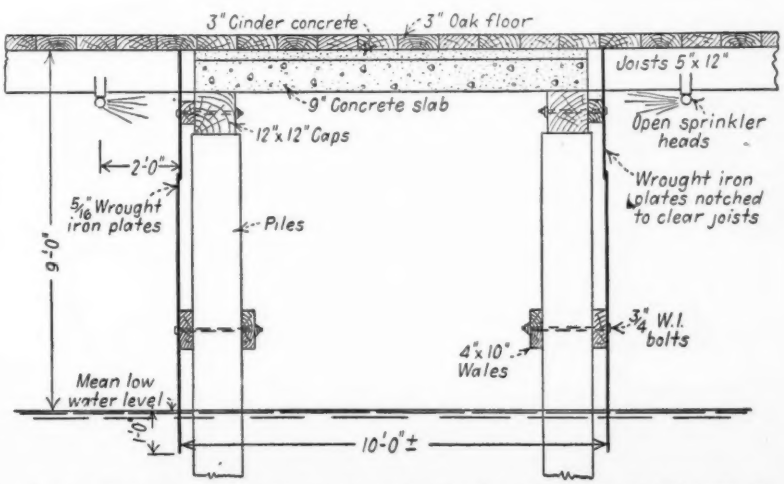
Fire-Stop Cells Constructed

To minimize the hazard of fire and to combat the ravaging effects of corrosion, four new fire-stop cells have been built beneath each pier, with Byers wrought iron plates forming the sides and ends, and cinder concrete the tops. Each of these cells was built to surround and isolate two adjacent pile bents the full width of the pier. The concrete top consists of a 3-in. layer of cinder concrete laid on top of a 9-in. concrete slab, supported by the caps. With the depth of the two layers of concrete equal to the depth of the joists, the oak flooring could be laid on top.

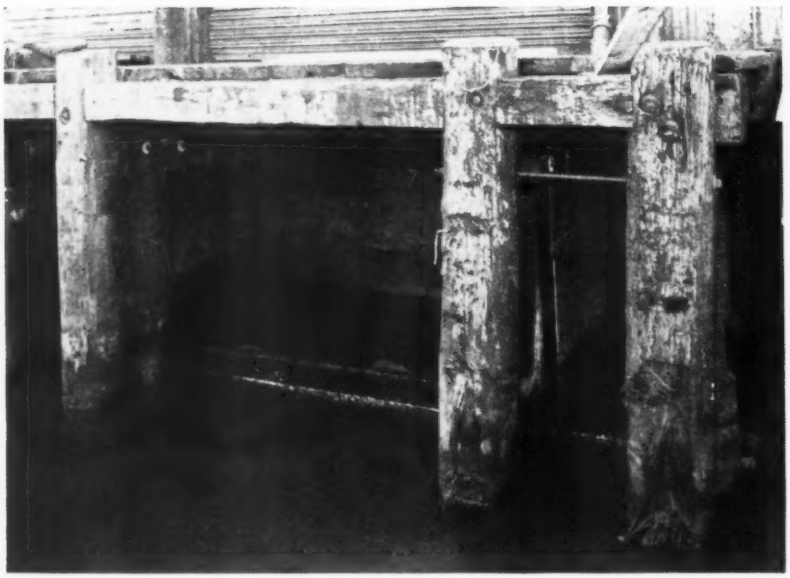
The sides of each cell were constructed of 5/16-in. wrought iron plates fabricated together so as to make a fire curtain 10 ft. deep, extending from the underside of the floor to one foot below mean low-water level. Each fabricated plate was notched at the top to fit between the joists and against the flooring, and at other places where cross bracing intersected it. These notches were cut so as to maintain a maximum clearance of ¼ in. between the wood and metal. The entire curtain was fastened near the top to the caps and slightly below center to the piles by ¾-in. wrought iron bolts. Spacing wales, 4 in. thick, through which the bolts passed, were used to separate the plates from the caps and piles. The two fire curtains forming each cell were closed at the sides of the piers about eight feet in from the edge of the aprons by additional wrought iron plates to seal the cell completely and surround the two rows of piles.

Sprinkler Heads

Open sprinkler heads were spaced five feet apart, two feet away from the wrought iron plates, and, when manually operated, provide a spray of water against the plates to prevent heat transfer through them to the supporting timbers. These sprinklers are on 4-in. water lines supplied by a



Cross Section of Typical "Twin" Fire Curtains Showing the Cooling Sprinkler Heads



The End and Side Plates Form a Wrought Iron Fire Curtain Completely Surrounding Two Rows of Piles, and Make an Impregnable Barrier, 10 ft. Wide, Across the Pier

10-in. overhead main running through the pier shed. A 100,000-gal. elevated tank is used to supply water for the fire protection system. As further protection, the end of each four-inch line is fitted with a connection by means of which fire boat pumps can supplement the tank pressure.

The A. M. Byers Company, Pittsburgh, Pa., supplied approximately 175 tons of wrought iron plates for the fire walls, which were designed under the direction of W. P. Wiltsee, chief engineer of the Norfolk & Western. The installation was made by John P. Pettyjohn & Co., Lynchburg, Va., under the supervision of J. Y. Neal, assistant engineer of the N. & W.

These Recent Accidents Involved the Track Forces

THE Interstate Commerce Commission has recently issued reports on several train accidents, having aspects of interest to maintenance of way men. Of these, one was caused by a broken rail, resulting from a transverse fissure; another was a head-end collision between a track motor car and a freight train; a third involved a self-propelled crane which went out of control on a grade and collided with a cut of cars standing on a siding; and, still another accident, a passenger train collided with a landslide. As the result of these occurrences, 3 persons were killed and 66 others were injured. Brief abstracts of the commission's reports are given below.

A passenger train was derailed at a broken rail in the northward main track of the Seaboard Air Line near Maxville, Fla., on February 14, 1947, resulting in injury to 31 persons. The train involved, a northbound passenger train, included a three-unit Diesel-electric locomotive and 16 cars. While moving at a speed estimated at 75 m.p.h. at a point 1.2 mi. north of Maxville, the intermediate wheels of the rear truck of the eighth car and the ninth to sixteenth cars, inclusive were derailed.

It was found that a rail in the west side of the northward track was broken into five pieces, the first break being 3 ft. ¾ in. north of the receiving end, while the second, third and fourth breaks were 2½ in., 10 ft. 5½ in. and 10 ft. 1¾ in. further north, respectively. An 18 per cent transverse fissure was found at the first break and, from marks on the wheel flanges and on the broken pieces of rail, it was apparent that the rail broke at this point as the front section of the train passed over it, following which, the broken pieces became displaced.

The rail involved was of 100-lb. section and was laid new in 1934. The section foreman inspected this track about eight hours before the accident but no defective condition was observed. A rail-flaw detector car was operated over the line on November 21, 1946, but disclosed no defect in the rail in question.

Track Car—Train Collision

The head-end collision between a track motor car and a train in which a signal maintainer was killed occurred on February 16, 1947, on the Oregon division of the Union Pacific near Farley, Ore., a single-track line, over which trains operate by timetable, train orders, automatic block signals and automatic train control. Wayside track-occupancy indicators are provided to govern the movement of track motor cars, and the operating rules require that motor cars must be removed from the track whenever the indicators or the block signals indicate the approach of a train. Further, employees in charge of track motor cars are required to obtain written line-ups.

About 6 p.m. on February 19, the train dispatcher communicated with a signal maintainer at Bridal Veil, 20.4 mi. west of Farley, and instructed him to proceed to a point about 12 mi. east of Farley to investigate a signal failure. The dispatcher understood that the maintainer would make the trip by automobile and no information was given the maintainer regarding train movements in this territory. A section foreman, the only other occupant of the motor car, stated that when the car was placed on the track he asked the maintainer if he had obtained a line-up of train movements and that the maintainer had replied "O.K." At a point about 1.1 mi. east of Farley, the motor car collided with a westward freight train and the maintainer was killed. The foreman stated that he did not observe the indication displayed by the track-occupancy indicators or the automatic block signals immediately west of the point of accident. In tests after the accident it was found that the indicators functioned properly. Be-

cause the block signals are of the approach-lighted type, no indication would have been displayed by these signals.

The commission found that the accident was caused by failure to provide adequate protection for the movement of the motor car, pointing out that, had such protection been provided, neither the motor car nor the train would have been allowed to enter a block occupied by an opposing movement. It further recommended that the Union Pacific provide adequate block-signal or train-order protection for the movement of motor cars on its line.

Crane Runs Wild

On March 14, 1947, a maintenance-of-way department self-propelled crane was moving on a 2.2-per cent descending grade on the main track of the Los Angeles division of the Union Pacific at Hayden, Cal., when the occupants heard a noise indicating that some part of the mechanism had broken. From this point, the crane moved out of control for a distance of about two miles, through a power-operated No. 10 turnout and into a siding where, while moving at a speed estimated at 35 m.p.h., it crashed into a standing cut of cars. The crane operator was killed and five other employees were injured.

It was developed that, on the day of the accident, the crane operator had replaced the lining of the brake band on a brake drum located on one of the propeller clutches. However, the anchor pin and washer, which should have been used to retain the dead end of the brake band on its anchor lug, could not be found, and the band at this end had become free of the lug. Therefore, no braking power could be applied to retard the movement of the crane.

Apparently, the operator had disengaged the driving gears by placing the shifting lever in neutral, thereby allowing the crane to move under its momentum, and was depending on the brakes to control the speed.

After the brake band failed, the operator apparently operated the propelling gear clutch, which started the train of gears revolving, in an attempt to control the speed of the crane, but it was not possible for the remainder of the gears to mesh by use of the transmission shifting lever.. No other condition was found that would prevent the proper engaging or disengaging of any part of the mechanism between the motor and the axle. The crane was not provided with either a hand brake or a power brake. The commission found that the accident was caused by failure to provide the crane with an efficient hand brake.

Train Strikes Landslide

A landslide which occurred near Sudan, Mont., on March 17, 1947, derailed an eastward passenger train on the Chicago, Milwaukee, St. Paul & Pacific and caused the death of an express messenger and the injury of 30 persons. The track in the vicinity of this accident occupies a hillside cut. Above the roadbed, on the north side of the track, the hillside rises on a slope of about 3 to 1, to a height of 110 ft. above the level of the rail. The formation of the slope consists of clay, sand and gravel.

Train No. 16, consisting of an electric engine and 12 cars, was moving at an estimated speed of 50 m.p.h. when the engineman noticed a displacement of material from the hillside, immediately adjacent to the north rail of the track, about 750 ft. from the train. However, as the displaced material did not obstruct the track, he made a service reduction only. Then he noticed that the material was moving over the north rail and applied the brakes in emergency but the speed was not materially reduced before the train struck the slide.

Subsequently it was discovered that approximately 25,000 cu. yd. of moist clay, sand and gravel had slid from the hillside north of the track. Apparently, the toe of the slide moved to the track immediately in front of No. 16 and covered the track for about 204 ft. to a depth of as much as 3 ft. over the top of the rail.

The section foreman in charge of this territory reported that about 4 hr. 30 min. prior to the accident, he had observed the hillside and did not see any indication that a slide might occur. Only 0.26 in. of precipitation had fallen in this area during the 16-day period immediately prior to the day of the accident, according to the Weather Bureau. Analysis of the slide material disclosed the presence of mica, and this was taken as an indication that a subterranean source of water had saturated the slope to the extent that no bond existed in the material at the time of the slide.

This Poster, No. 286, Constitutes the July Installment of the "All the Year—Every Year Safety Program" of the Safety Section, Association of American Railroads

Small Station Gets "Going Over"

(*Continued from page* 680)

The counter front is constructed of plywood, faced with Vitrolite glass in keeping with the wainscot in the waiting room. It has a Formica top surface and is trimmed with a stainless steel moulding for its entire length.

Toilet Rooms

The new toilet rooms, equipped with fixtures of the latest type, are modern in every respect. In general, the interior finish in these rooms is the same as that in the waiting room, except that the wainscotings are carried to a height of 6 ft. All lighting in the public rooms of the station, as well as in the ticket office and the freight office, consists of indirect fluorescent fixtures suspended from the ceilings.

Structural changes at the north end of the old station proper, made in connection with the work of enclosing the open space to provide the storage and boiler rooms, included the removal of the bay window and the closing of all openings in the end wall, except one window which was converted into a door. The heating plant consists of an automatically-controlled oil-fired steam boiler.

In addition to the alterations to the buildings, a new concrete driveway, 45 ft. wide, was constructed along the rear of the station to connect with adjacent streets to the north and south.

Plans for remodeling the Dubuque station were made under the general direction of H. R. Clarke, chief engineer, Burlington Lines, and under the direct supervision of A. H. Simon, engineer of buildings. The work was done by the Peter Nelson Construction Company, La Crosse, Wis., as the general contractor.

Removing Silica from Boiler Water

By WALTER LEAF
Research Technician
Denver & Rio Grande Western
Denver, Colo.

In an effort to devise an improved method of removing troublesome silica from boiler water the Denver & Rio Grande Western undertook an extensive research program several years ago. Much interesting information was developed, including the fact that silica may be removed effectively and economically by rusting cast-iron wheel borings in the presence of the water to be treated. This article discusses the tests and describes a plant for removing silica, which is based on the findings.

A NEW process for removing dissolved silica from water has been developed in the laboratory of the Denver & Rio Grande Western. It consists of rusting iron in the form of cast-iron wheel borings in the presence of the water to be treated. The hydrous ferric oxide thus formed absorbs the silica by physical action. The ratio between the iron rusted and the silica removed depends upon the initial silica content of the water and the degree of silica removal. Roughly, a pound of iron oxidized to the ferric state will remove a pound of silica. The process is very low in cost, and has the added advantage of not introducing further dissolved solids into the water being treated. To the present time it has been used alone at Alamosa, Colo., where the water supply for the Rio Grande comes from flowing wells about 600 ft. deep. A typical analysis of this water shows:

	Grains per Gallon
Hardness	1.3
Menthyl orange alkalinity	5.3
Phenol alkalinity	0.2
Silica	5.0
Total dissolved solids	12.7

During most of the year, the silica remains constant at five grains per gallon, but in the summer, especially after dry weather in the San Luis valley, it has been as high as 10 grains. Hardness and alkalinity values have always remained at the figures given.

Before any method of treatment was used this water caused an extremely hard scale to form in boilers, with all the usual difficulties. Internal treatment, using phosphate-tannin compound in conjunction with magnesium sulfate, was started several years ago and gave improved results. However, it was still necessary to turbine the tubes of the stationary boilers each spring and fall. The cost of the compound treatment was $3.60 per day for around 40,000 gal, of make-up water.

Previous Methods

Research was started in the laboratory in 1944 to discover, if possible, a better and cheaper method of preventing the silica scale. Previously known methods of removing silica were tried and found effective. These methods included absorption on ferric or aluminum hydroxide precipitated from the chloride or sulfate salts with caustic soda or lime, and treatment with dolomitic lime. However, they were considered too expensive, the estimated cost being around 15 cents per 1,000 gal. for reduction from five grains to one. The newly-developed iron-exchange method using a regenerated bed is also high in cost, ranging up to about 80 cents per pound of silica removed.

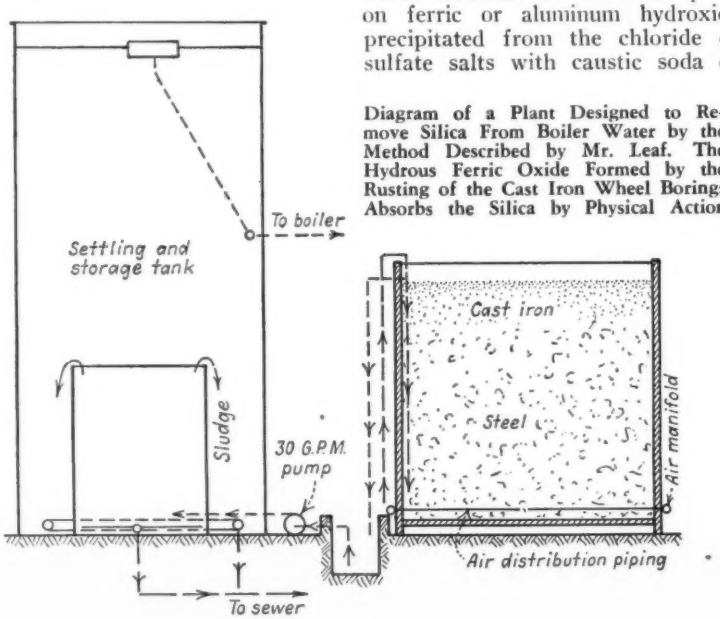


Diagram of a Plant Designed to Remove Silica From Boiler Water by the Method Described by Mr. Leaf. The Hydrous Ferric Oxide Formed by the Rusting of the Cast Iron Wheel Borings Absorbs the Silica by Physical Action

During the reasearch work it was found quite by accident that hydrous ferric oxide was very effective in removing silica, so this method was investigated in the laboratory and at Alamosa. At first, steel lathe turnings were used as the source of iron but later these were discarded in favor of cast-iron chips.

A plant to treat 30 gal. per min. was built early in 1944, consisting of a wood stave tank 8 ft. by 8 ft., for the steel lathe turnings, a settling tank, 7½ ft. in diameter by 15 ft. high, and the necessary pumps and controls. Alum and soda-ash tanks and feeds were also provided for experimental purposes.

What Was Learned

As a first attempt, water was sprayed over the steel to form the rust, but this proved unsuccessful. Over a period of a year and a half a dozen or more schemes were tried to accelerate the rusting process, and without going into detail the following information was collected:

(1) Oxide formed in the absence of silica and later added to silica-bearing water has only about one tenth the absorptive capacity of oxide which is produced in the presence of silica.

(2) Black magnetic iron oxide, Fe_3O_4, has no absorptive capacity for silica. It is necessary to oxidize the iron to Fe_2O_3.

(3) Aeration of Alamosa water, or any water containing sodium bicarbonate, breaks it down to sodium carbonate and raises the pH, thus reducing the corroding power of the water. Aeration of a calcium bicarbonate water produces insoluble calcium carbonate which has no effect in raising the pH.

(4) Lowering the pH of Alamosa water to as low as 5.0 with alum, sulfuric acid or carbon dioxide gas had very little effect in increasing the rust-producing rate.

(5) The high silica content of the Alamosa water formed a dense protective film over the iron surface preventing further rusting. This film could not be broken off with violent air agitation.

(6) Cast-iron chips rust about 10 times as rapidly as steel, due to the electrolytic action between the free carbon particles and the iron. The progress of the reaction in the presence of air and water is to form magnetic iron oxide which is later converted to ferric oxide. Thus, a cast-iron chip rusting in aerated water has a film of brown or red ferric oxide over its surface and underneath this a film of black magnetic oxide next to the iron.

(7) To prevent plugging of the pores between the particles of cast iron with the products of oxidation, it is necessary to stir or agitate the chips occasionally. Such agitation breaks off the oxide film and offers fresh iron surfaces for continued oxidation. If agitation is oftener than every two hours in the Alamosa supply, the oxide is chiefly black, which has no absorptive capacity. Maximum benefits can be obtained with agitation about every four hours.

(8) The black oxide separated from the cast iron can be further oxidized to ferric oxide by aeration, but the reaction seems to be faster if it is left undisturbed on the cast-iron chips.

(9) The hydrous ferric oxide produced by rusting differs physically and chemically from ferric hydroxide formed by precipitation with ferric chloride and caustic soda, and has roughly four times the absorptive capacity of the hydroxide in terms of the iron content.

(10) The quantity of silica removed is a function of the amount of iron oxide produced and the initial silica content. Thus one "unit" of the oxide removes half of the silica present, two "units" remove three-fourths, three "units" remove seven-eights, four "units" remove fifteen-sixteenths, etc. For an initial silica content of seven grains, this unit is about 0.35 lb. of iron per 1,000 gal. and for an initial silica content of five grains the unit is about 0.25 lb. of iron. These "unit" values apply to the Alamosa water, and may or may not hold for other types.

The present plant at Alamosa consists of an 8-ft. by 8-ft. wood stave tank with about a 5-ft. depth of steel lathe turnings left from previous trials, and a 2-ft. depth of cast-iron wheel borings, of which the top foot is spaded up by hand each day with a garden fork to prevent cementing of the chips. Air is distributed through small holes in a system of copper pipes in the bottom of the tank. This system includes a header pipe with branch pipes placed a foot apart. Holes are drilled every six inches along the branch pipes. However, about one-third of the holes are plugged and deliver no air, with the result that the system is inefficient. With around 50 cu. ft. of cast-iron chips exposed to 30 gal. per min. of water containing 5 grains of silica, sufficient rust is produced to reduce the silica content to 0.8 grain.

The water flows from the wood stave tank to a small sump from which it is pumped to the settling tank. Automatic control switches and a float valve keep this tank full, and the water flows by gravity to the service tank.

To Replace Wood Tank

It is planned to tear down the wood stave tank and substitute a closed steel drum, 4 ft. 6 in. in diameter and 4 ft. 6 in. long, mounted on rollers with its axis horizontal. Air and water distributing pipes will be run through the tank around the lower third of its periphery, and an outlet will be provided at the axis. The tank will be kept about half full of cast-iron chips, and will, of course, be full of water.

A motor drive through reduction gears, with a drive chain around the tank, will allow it to be rotated a full revolution in one direction, turned back about 1¼ revolutions, then set to the original position, a procedure that will be followed every four hours or so. Such rotation of the drum will completely remove the accumulation of rust. Since the angle of repose of the chips is about 45 deg., the drum must be rotated back past its final position so that the chips will be at rest with an approximately horizontal surface. Rubber hose connections to the air and water distributing pipes will be necessary for flexibility during rotation. A small model of such a drum has been in operation to determine its characteristics, and the specified dimensions were calculated from the model. With five grains of silica in the influent, the finished product should have below one grain.

Naturally, this proposed steel drum will rust out in several years and will have to be replaced. When the time comes, further operating data will be available, and a stainless steel or other more permanent tank can be substituted.

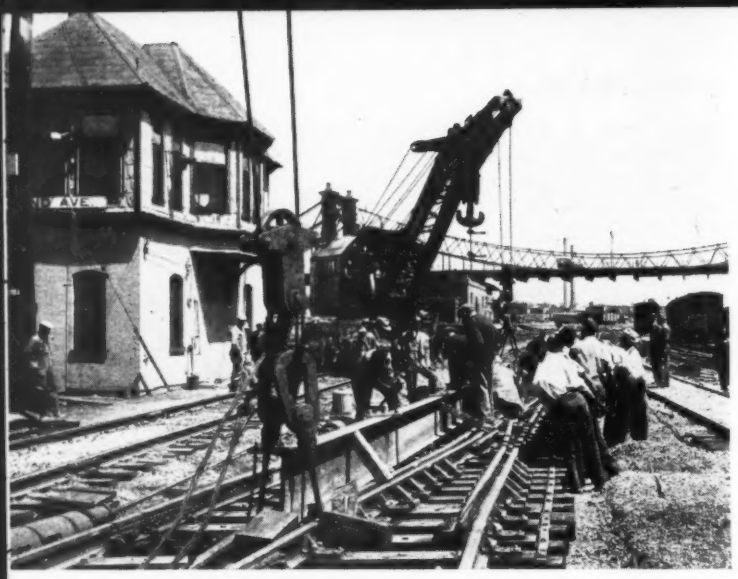
Results Effective

The iron oxide produced in Alamosa water is partly in nearly colloidal proportions so that it doesn't settle out readily. Alum coagulation had been provided, but was not reliable, so that considerable "color" of iron oxide was carried to the boilers. Just what effect this material would have was unknown, but after six months of operation, the boilers were in excellent condition internally. A thin film of slime covered the tubes, but was so soft that it could be washed off completely with a gentle stream of water. After standing a week, this film dried to a scale which was so soft it fell off of the tubes, and flakes could be easily crumbled to a powder between the fingers. Analysis showed it to have a chemical content as follows:

Organic matter	9.0 per cent
Silica	36.1 per cent
Ca O	9.4 per cent
Mg O	2.1 per cent
P_2O_5	6.7 per cent
Fe_2O_3	26.0 per cent
So_3	trace

Here was a boiler scale with 36 per cent silica, yet so soft it could be crumbled in the fingers. Obviously, the 26 per cent iron oxide kept it in this condition, hence the alum coagulation was discarded, and whatever iron oxide would not settle out was allowed to go to the boilers without concern. It was extremely beneficial, and it is planned to install a small rusting tank to provide iron oxide to a power plant boiler where internal treatment with soda ash and tannin has not been efficient in preventing scale. The tannin will be eliminated in this new test. Obviously, the hydrous ferric oxide is efficient in preventing cementation of sludge to form scale.

From observations made so far, it seems that complete removal of the silica is not necessary in order to insure clean boilers at Alamosa. It is thought that a residual of one to two grains will do no damage as long as the finely-divided iron oxide is also carried to the boilers, which operate at a presure of 125 lb.



Slip Switch Goes in Fast

By W. W. SALISBURY

Division Engineer, Missouri Pacific
St. Louis, Mo.

The Prefabricated Unit, Stiffened by a 60-ft. I-Beam, Was Lowered Into Position on the Prepared Bed by Two Derricks. Here It Is Being Lined Into Position

MAKING full use of the advantages inherent in prefabrication, the Missouri Pacific recently installed a new double-slip switch at the busy Grand Avenue interlocking plant on its St. Louis terminal division in slightly less than six working hours, without delay to train movements. This interlocking is used not only for all the passenger movements of three railroads—Missouri Pacific, Wabash and St. Louis-San Francisco—but also controls the Missouri Pacific's main line freight movements from its Twenty-Third Street yards, many "transfer drags" of the Frisco and Wabash, as well as the movements of light engines between their roundhouses and the St. Louis Union Station. Because of the density of such traffic it is essential that any major replacements which become necessary must be made without keeping any of the tracks out of service very long.

Therefore, when it became necessary to replace the 90-lb. double-slip switch which had seen more than 20 years of service, careful plans were made to do the work in a minimum length of time. The new unit, constructed of 112-lb. rail by the Ramapo-Ajax division of American Brake Shoe Company, was assembled in advance on a slight embankment north of the tracks and about 50 ft. from where it was to be installed. At this location it was tested for smooth, flawless operation by means of temporary air and electric connections to its new switch movements. Then, a 60-ft. steel I-beam was clamped to the ties through the middle of the slip to stiffen it throughout its 110-ft. length, and to permit its 40 tons to be lifted by derricks without disturbing the alinement or adjustment.

With these preliminaries complete, the installation began at 9:10 a.m., May 5, when wrecking crews moved out of Ewing avenue and Dupo yards onto the westbound main track directly behind Missouri Pacific's train No. 23. After the old slip had been cut into three sections, each was lifted from its position and carried to a dump along the right of way where it could be dismantled later. This operation was completed in less than one hour.

A Complication

However, the placing of the new slip, involving more work and requiring greater finesse, was a slower task. To be placed in position it had only to be lifted over one track and moved about 50 ft. However, a 10-pair telephone cable, attached to a terminal pole just west of the tower, was in the way of this operation, and, because of the existing telephone strike, could not be moved. Thus it was necessary to make the first lift from a high-boom position, shifting the unit as far as possible toward the track without disturbing the cable. The slip was then cribbed up while the lifting slings were disconnected and the booms shifted so that the second lift could be made with the lifting lines and blocks on the south, or track, side of the cable.

Notwithstanding this awkward situation, the unit was landed in its proper position at 1:50 p.m., and the track was back in full service shortly before 3 p.m. The precision of the wrecking crews in charge of the derricks was demonstrated by the fact that when the unwieldy unit was landed it was slightly less than three inches off the center stakes.

The project was in charge of H. M. Noel and C. H. Hanson, roadmaster and assistant roadmaster, respectively, of the Missouri Pacific's St. Louis terminal division. Exclusive of the wrecking crews, the work was accomplished by a 30-man division extra gang assisted by 2 welders and the necessary signal maintainers.

One of the Three Sections Into Which the Old 90-lb. Slip Crossing Was Cut Is Shown Being Removed by One of the Wrecking Derricks

Efficient Operation of Motor Cars

Part II

By G. R. Westcott
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No. 14 of a Series

This is the second part of a two-part installment dealing with the efficient operation of motor cars, in the continuing series on the selection, care and operation of track motor cars. In this section the author continues with a discussion of the care of cooling systems, the use of anti-freezes, fuels, obsolescence and purchasing practices, followed by 18 rules for the efficient operation of cars. Part I of this article gave particular attention to such factors as keeping the car in condition, racing the engine, applying the load, making adjustments, and the first part of the discussion of cooling systems for motor cars.

THE BEST known and most widely used anti-freeze of the permanent type is ethylene glycol sold under various trade names. Prestone is of this character. Ethylene glycol must be treated to inhibit corrosion of the metal parts of the cooling system and deterioration of the radiator hose. It must also be treated to prevent foaming. When sold expressly for use as an anti-freeze, it has generally been so treated.

Unlike alcohol, ethylene glycol does not evaporate at ordinary temperatures, and its boiling point is higher than that of water. For these reasons, it resists loss by evaporation and boiling away at the usual temperatures of the coolant. Its specific gravity is also greater than that of water and the greater the porportion of ethylene glycol in the mixture, the higher the hydrometer float will rise. While the graduations on the float read from the bottom up as the freezing point of an alcohol mixture is reduced, those on the ethylene glycol scale read from the top down.

While the loss of permanent anti-freeze by evaporation is negligible, care must be taken that it is not lost through leakage, for it is the general impression that ethylene glycol will seep through hose connections, the packing gland of the pump, or past gaskets, where water will not. This impression is due, in part, no doubt, to the fact that upon the introduction of the anti-freeze into the cooling system, some of the incrustation in the system that has previously prevented leakage is loosened by the inhibiting treatment in the anti-freeze, and old leakage channels are thus opened up. It is therefore necessary that, before putting ethylene glycol into the cooling system, extreme care must be taken that the system be thoroughly cleaned and all connections tightened.

Ethylene glycol should not be permitted to get into the crankcase as it will cause gumming and sticking of moving parts. Should this occur, the oil should be drained and the engine cleaned thoroughly.

When first applied, ethylene glycol should be mixed with water in the proportions given by the manufacturer. Thereafter, any loss of the coolant that is known to be due to evaporation may be made up by adding water. As there is likely to be some uncertainty as to the manner in which the loss occurred, it is safe practice to add water and anti-freeze in the same proportions as in the original mixture.

In applying any anti-freeze it is important to remember that space must be left in the cooling system for the expansion of the coolant. For each gallon of coolant, the thermal expansion will increase the volume ¼ to ½ pint in a temperature rise from 40 deg. F. to 180 deg. F. Unless two to three inches space is left in the top radiator tank when filling, a considerable amount of anti-freeze may be lost through the overflow.

Before any anti-freeze is added to the cooling water, the cooling system should be cleaned to remove any rust or sediment in the system. Whether the cleaning will also remove scale will depend on the chemical nature of the scale deposits and of the cleaner used; one cleaner will be more effective under one condition and some other in another case.

Among the cleaning agents used are: Sal soda (washing soda); soda ash, used by some railroads for the treatment of boiler water; a mixture of hydrochloric acid, formaldehyde and water; and various commercial radiator cleaners procurable at automotive supply houses. The strength of the mixture and the length of time it should remain in the cooling system vary with the agent used.

After draining the system, fill it one half full of clean water. To a like amount of boiling water add all the sal soda that it will dissolve. While still hot, add this solution to the cooling system, completely filling it. After running the engine as usual for 24 hours, drain, flush thoroughly and refill with clean soft water.

Detailed procedure for the use of other cleaning agents will be found in instruction books furnished by engine manufacturers, and on cans containing commercial cleaners.

Although the cleaning of the cooling system is especially important before adding anti-freeze, it is recommended also when the anti-freeze is removed in the spring, and may be desirable at more frequent intervals if the cooling water is not free from impurities.

Cold weather introduces other conditions in the operation of a motor car which, unless understood and provided for, may cause a considerable drop in the efficiency of its operation. When the engine is cold, the lubrication is not effective, the fuel does not vaporize readily, and a cold

battery may be weak. It is important, therefore, that special attention be given the engine in starting. In four-cycle engines, the lubricating oil used in winter should generally be lighter than that used in warm weather. In addition, the pour point, or temperature at which the oil will flow, must be low enough so that the moving parts receive lubrication quickly after the engine is started. A more careful adjustment of the carburetor is necessary and all ignition parts must be in condition to produce a hot spark.

The handling of the engine at starting is also important. Some use of the choke may be required, but choking unnecessarily is wasteful of fuel and destroys the effectiveness of the most careful carburetor adjustment. The period of idling before the load is applied must be long enough so that all parts are adequately lubricated or serious damage may result.

Fuel

Three grades of gasoline are generally available. These are known as Premium, Regular and Third grade. This classification is based more on price than on actual quality; that is, the octane(1) rating of the gasoline may vary in each class so that the classes may overlap considerably, and gasolines on the border line may be sold under either price classification. Premium gasoline contains ethyl fluid to improve its anti-knock characteristics, and is especially adapted to use in engines having a high compression ratio. Regular grade gasoline, also, often contains some ethyl fluid. Current methods of manufacture and the use of ethyl fluid permit holding the octane rating of premium and regular grades within fairly close limits. Third grade gasoline, however, may vary widely in quality.

Except in some large inspection cars having automotive-type engines, the engines used in motor cars are of comparatively low compression, and the octane rating of the fuel used is of less importance. The use of the premium grade gasoline is rarely warranted. Some railroads use regular grade at all times. Others, especially in cold climates, use it only in winter, principally as an aid to starting, and use third grade during the balance of the year. Still others use third grade fuel throughout the year.

Care in handling gasoline is perhaps of greater importance than the grade used, for it is quite well established that either regular or third grade fuel will give fairly efficient service in the average motor-car engine, providing the fuel is clean and free from water. Keeping it free from water is not easy. A lowering temperature will cause condensation of moisture in any container if there is any considerable amount of air in the container. Storage tanks of whatever size, therefore, should be arranged so that the condensed water, which, if the container is not agitated, will settle to the bottom, can be drawn or pumped off. Doing this at store points should be as much a part of the routine of handling gasoline as the receiving of new stock or the filling of orders.

Condensation may also take place in shipping drums, and even in cans or the fuel tank of the engine. For this reason, every engine should have a filter in the fuel line, and the filter bowl should be cleaned frequently, especially during cold weather.

Condensation of moisture in underground storage tanks is not so common as such tanks are not so subject to severe changes in temperature. Water may collect in the bottom of such tanks, however, and unless pumped out, may cause much engine trouble.

On any engine the correct adjustment of the carburetor is essential for fuel economy, but fuel can be wasted in the operation of the car even with the most careful carburetor adjustment. Excessive use of the choke has been mentioned. Other sources of waste peculiar to two-cycle engines are coasting with the ignition off and reducing the power by retarding the spark. Speed and power should be controlled by the throttle, not the spark.

One loss of efficiency due to improper handling of fuel occurs sometimes through an attempt to use clear gasoline in a two-cycle engine, or mixed fuel in a four-cycle engine. In addition to the waste of the fuel itself, such an error may result in serious service failures and high repair costs. Even though the user does not understand the requirements of each type of engine, the hazard of using the wrong fuel will be lessened if the fuel tank on each engine is stencilled, "Use Mixed Gas Only" or "Use Clear Gas Only," as the case may be.

Obsolescence

There are certain requirements of efficient operation that lie outside the direct control of either the user or the maintainer. The continued use of cars of outmoded design or of old style parts that, when worn out, could be replaced with cars or parts of improved design, often contributes to inefficient operation. Modern cars are notably more dependable and, therefore, more efficient than those built 10 or 15 years ago. Consideration should be given to replacing such old cars with those of modern design, or, if they are otherwise in good condition, to applying differential axles or demountable wheels, which may do much to reduce future maintenance. On a car having an old style two-cycle engine with sliding base, the application of an idler for tightening the belt, or of an improved timer, may be warranted. In making such changes, however, care must be used. Prolonging the use of an old car beyond its reasonable life may often prove expensive.

When Purchasing Cars

In the purchase of motor cars, their repair parts or the fuel and lubricants used, it should always be kept in mind that service is the commodity for which the money is spent. Here is a case where the old adage "a penny saved is a penny earned" may be entirely wrong; in saving that penny, a dollar or many dollars in efficiency may be lost. Such losses in service are very common. No discussion of efficient operation would be complete without a consideration of this feature. It has been touched on previously in this series of articles, but is of such importance that a summary is included here at the risk of repeating what has previously been said Some of the points to be considered are:

(1) In the purchase of cars, efficient operation will be served best if the number of makes and types is held to a minimum, and, so far as possible, the cars selected should be those that have been found to be dependable in service and reasonable in maintenance cost. Limiting the number of makes and types will reduce the number of items of repair parts that must be carried in stock, and with the same investment in parts will permit carrying a sufficient number of parts on hand to insure prompt furnishing when needed. In addition, because of greater familiarity with the more limited number of makes and types, the users will experience less interruption to their work because of car failures, and maintainers will expend less time in maintaining them.

(2) In the purchase of repair parts, efficient operation will be served best if only parts that have been proven by test to give good service are furnished. The substitution of non-standard parts that are ill fitting or of poor material may result not only in short life of the parts themselves, but also in undue wear of other parts. Outstanding examples of these are pistons of slightly different design, weight or

(1) For a definition of "octane rating" see article on "Getting a Spark," in the May, 1946, issue, page 539.

balance, piston rings of incorrect wall pressure, and belts of poor material or design. Substitute parts may be quite equal to those furnished by the manufacturer of the car, but until they have proven so, their use is to be questioned.

(3) If efficient operation is to be secured, the fuel furnished must be of a reasonably good grade, and generally free from water and other foreign matter. It has already been noted that the requirement as to the octane rating of the gasoline is not very exacting for most cars.

(4) The effects of the use of unsuitable or poor quality lubricants are far reaching, and responsible for much loss of service. Undue wear of parts, delays in starting, carbon formation, and sluggish performance are a few of the conditions causing loss of efficiency directly traceable to poor lubrication. The operation of a section car having a two-cycle engine may be taken as an example. Such a car, using two gallons of mixed fuel a day, which is a very generous average, will use about 50 gal. of oil in a year's operation. The difference in price between an oil of poor quality and one of suitable quality, as a rule, will not exceed 20 cents a gallon. The use of the cheaper oil thus results in an initial saving of $10 per year. If applied to 1,000 cars, this amounts to a considerable saving. But if the use of the cheaper oil results in so much as four hours' delay in the entire year to a gang of five men depending on that car for transportation to their work, the saving of $10 is more than offset; or if the maintainer must make one extra trip to an outlying point to remove carbon from the engine, the saving is gone; and if by reason of the poor lubrication, a cylinder, a crankshaft or other major part of the engine must be renewed, the yearly saving may be wiped out several times over. These are conditions that are well known. They can be corrected only by a realization that the commodity being purchased is not the material itself, but instead, the service that can be secured from it.

Rules—Efficient Operation

(83) Keep the car in condition for service by making repairs and adjustments promptly; but avoid tinkering.

(84) Do not race the engine.

(85) Do not apply the load until the engine has developed sufficient power to handle it.

(86) Apply the load smoothly; do not strain the parts by sudden application.

(87) Do not tighten belt or clutch more than necessary to take the load.

(88) If car has selective transmission:

- (a) Use low speed for starting.
- (b) Use the correct speed for the load being handled.
- (c) Do not shift to high speed unless load can be handled easily at that speed.

(89) If manual spark control is provided, retard spark for starting and for low speeds and heavy loads.

(90) Advance spark when speed picks up.

(91) If engine runs too hot or too cold, find and correct the cause.

(92) Keep cooling system clean and in good condition.

- (a) If air-cooled, do not obstruct free flow of air about cylinders in warm weather; but protect from cold blasts as required in cold weather.
- (b) If hopper-cooled, with or without condenser, fill only to correct height and, after freezing, do not permit water to freeze again until completely thawed.
- (c) If radiator-cooled, keep fan in good working order. Keep all hose connections tight. Protect from cold blasts as may be required in winter.
- (d) Use only clean soft water in cooling systems.
- (e) Use correct pump grease to prevent leakage and wear of pump shaft.
- (f) In winter, use anti-freeze or drain cooling system when engine is not running.
- (g) Test cooling solution frequently and add anti-freeze if required.
- (h) Leave space for expansion when filling cooling system, especially if anti-freeze is used.

(93) In cold weather, warm engine by idling before applying load.

(94) Keep gasoline free from water. Drain or pump condensed water from storage tanks when required.

(95) Keep carburetor in good adjustment.

(96) Avoid excessive use of choke.

(97) Do not attempt to use clear gasoline in two-cycle engines or mixed gasoline and oil in four-cycle engines.

(98) Do not keep obsolete cars in service; replace them with modern cars.

(99) Modernize old cars with caution; do not spend more on them than can be justified economically.

(100) Purchase service rather than materials.

- (a) Restrict the number of makes and types, and thus reduce the the stock of parts required and otherwise simplify maintenance.
- (b) Purchase only standard parts or those that have been proven in service.
- (c) Do not be "penny wise and pound foolish" in purchasing lubricants. More loss of service and cost of maintenance than is generally realized is due to the use of unsuitable oils and greases.

* The numbering of these rules is consecutive with the rules published in previous installments of this series.

Longer Life for Tamping Bars

THIS illustration shows new tamping bars being built up with a coating of Hascrome iron-base alloy. The alloy is applied over the end of the bit and up the sides for a distance of about one inch. This product is a work-hardening metal that is said to have good resistance to abrasion and high resistance to impact. In depositing the alloy, which is supplied in rod form, it is recommended that a slightly excess acetylene flame be used and that the base metal be brought to a sweating heat. The metal should not be allowed to puddle. No after-treatment is required after the bar has been built up. It is said that the life of alloy-steel ballast-tamping bars can be extended by as much as 100 per cent when the bit ends of the bars are built up with hard-facing alloy.

What's the ANSWER?

Spacing Crossties Uniformly

Should crossties be uniformly spaced without regard to joint locations, or should spacing be altered at joints to provide either suspended or supported rail ends? Why?

Prefers Uniform Spacing

By H. R. Clarke
Chief Engineer, Burlington Lines, Chicago

Where joints are not slot-spiked, there seems to be little, if any, advantage in a special spacing of ties at the joints. Since the joint is weaker than the intermediate rail, it would seem that additional support at that point would be justified. In an effort to determine, if possible, any advantage there might be in a definite plan of spacing ties under joints, tests were made, extending over several years, in which ties were spaced: (1) Uniformly without regard to joint location; (2) to provide supported rail ends; and (3) to provide suspended rail ends. The observations of these test installations, made under conditions as nearly similar as possible, indicated that while there might be a slight advantage in a specific spacing of the ties at joints, it was not great enough to justify any substantial expenditure to provide it.

Spacing ties in any specific pattern requires that the track be surfaced at the time it is being done. This would necessitate surfacing the track promptly after relaying rail in order to space ties. There is, I think, a growing opinion among maintenance men that it is better practice, if possible, to place the track in good surface and line before the rail is laid, resurface or reballast the track, and, if it is necessary, space the ties when this is done. This greatly reduces the amount of work required to insure against damage to rail after it is laid, and permits the immediate and permanent anchoring of the rail against ties which are firmly set in the ballast, thereby holding the force of rail expansion to the greatest extent possible. This cannot be done if track is resurfaced after the rail is laid.

Considering this important factor, it is our opinion that the best and most economical results can be obtained by uniform tie spacing, without regard to joint location. Insulated joints are exceptions where the ties should be spaced to provide either supported or suspended rail ends, depending upon the length of the joint bars.

Space Uniformly

By Edward Wise, Jr.
Engineer Maintenance of Way, Louisville & Nashville, Louisville, Ky.

Crossties should be uniformly spaced without regard to joint location, except at insulated joints, for experience has proved that the labor cost of altering the spacing to provide either suspended or supported rail ends is not justified. At insulated joints, crossties should be spaced so as to give the joint bearing on two ties.

Evenly Spaced Ties Better

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

Now that rail anchors or anti-creepers have reached their present state of perfection, there are no reasons why rails cannot be held in place irrespective of what were formerly called joint ties, or regardless of whether the splice bars extend over one, two, or three ties.

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered in September

1. *On heavy-traffic territories where 130-lb. or heavier rail is in general use, what is the most effective method of replacing a broken rail using a limited number of men? What other conditions govern the choice of procedure? Why?*

2. *What are the advantages and disadvantages of using upholstered furniture in the waiting rooms of new or remodeled passenger stations? Does the size or importance of the station make any difference? Why?*

3. *What are the advantages or disadvantages of having highway trucks repaired by private garages rather than by company forces? Does the extent of the repairs necessary make any difference? Explain.*

4. *What applications, if any, can be made of the cold-riveting process in constructing railroad bridges or other structures? What are its advantages and disadvantages? Why?*

5. *What are the relative merits of six-point and eight-point mechanical tamping in multiple-track territory? Does the height of raise or kind of ballast make any difference? Why?*

6. *Is it practicable to equip water service employees with portable, power-driven pipe-threading machines? What considerations are involved?*

7. *In what manner is the ability of the railroads to secure and hold desirable men in track work influenced by the use of mechanical equipment? Is this an important factor today?*

8. *What is the relative paintability of various woods? What effect does this have on the choice of wood for use in railway buildings? Why?*

Crossties should be evenly spaced without regard to joint locations in order that the rail may have uniform support and no ties will be moved on their beds at the joints. This will be effective only if the splice bars are of the type that will not contact spike heads and the rail has sufficient anti-creepers applied to hold it in place under all conditions. To preserve uniform spacing of ties adjoining turnouts and bridges, it may be found desirable to apply a substantially larger number of anti-creeping devices than are usually required on other stretches of track.

Even Spaces Aid Cribbers

By W. H. Sparks
General Track Inspector, Chesapeake & Ohio, Russell, Ky.

So much dirt falls from the many cars now moving over the railroad that the ballast is quickly fouled to the point where it begins to get sloppy. For this reason ballast cleaning, not only at the ends of ties, but in the cribs as well, is an essential part of maintenance work. The importance of this work has helped to develop crib-cleaning machines. These machines can do a better job if all the cribs are uniformly spaced. For this reason ties should be spaced from 19 to 21 in. apart throughout the entire rail length, except at insulated joints where there might be a need for closer spacing so as to support the bars better and prevent damage to the insulation. Uniformly spaced ties make a railroad appear at its best, ride well and make it easier to maintain.

Joints Need Closer Ties

By William Lindsey
Extra Gang Foreman, Chicago & Illinois Midland, Springfield, Ill.

Only when all rails are welded can uniform spacing of all ties be the general practice. Until that time arrives, the joint should receive special attention. Being the weakest part of the rail structure, each joint should have a tie under the rail ends.

A tie placed under the ends of the rail tends to absorb some of the shock transmitted by the wheels. This, in turn, eliminates a certain amount of surface bending, as well as a lot of the noise.

When six-hole bars are used, a tie under the rail ends is a "must," because too much rail is left suspended if ties are applied in the traditional way, with one under each end of the splice bar.

Space Four-Hole Joints

By R. A. Ullery
Assistant Engineer, Bessemer & Lake Erie, Greenville, Pa.

The impact from wheel loads on rail ends and the lesser stiffness of the rail joint in comparison to that of the rail itself causes higher loading on the joint ties than on others. Consequently, ties should be spaced as close together at the joint as tamping requirements will permit, and wider throughout the remainder of the rail panel in order to equalize better the loading per tie, and to prevent undue settlement at any one point.

Where four-hole joint bars are in use, every effort should be made to space ties so as to provide suspended rail ends, thus avoiding a situation in which one tie supports the entire joint load.

Under 131-lb. and heavier rail, using six-hole bars, the spacing of ties at the joint is not as necessary as it is with four-hole joints, and could even prove uneconomical. The stiffness of the heavier bars more nearly approaches that of the rail, and the long length of these bars allows the joint to be supported by at least two ties under any condition. Unless the track is to be given a general lift, where ties can be shifted readily, the cost of spacing, coupled with the disadvantages of moving some ties off their old beds, may be out of proportion to the benefits gained from a three-tie-supported joint.

Packing Reciprocating Pumps

What procedure should be followed in packing reciprocating pumps? What kind of packing should be used for hot water? For cold?

Don't Squeeze Too Tightly

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

Before attempting to pack a reciprocating pump, it is essential that the alinement and condition of its shaft be checked carefully. Any incorrect alinement must be corrected. If the shaft is worn or scored, corrections must be made. If only slightly worn, it can usually be smoothed up by use of fine emery cloth. If the shaft is considerably worn, it will be necessary to turn and polish the worn section insofar as it may come in contact with the packing. If necessary to resort to this course of action, a packing gland to suit the new size of the shaft must be provided.

For pumping hot water, we have found that hollow, metallic packing of correct size is essential. Usually the pumper whose duties it will be to tighten the packing gland may not have a delicate sense of touch, and may squeeze the packing too tightly. Hollow, metallic packing will take care of the lack of delicate pressure that is essential in solid packing. If packing is too tight it will wear quickly and may score the shaft.

Packing manufacturers have perfected their product to such an extent that any suitable packing recommended by a reputable firm will do for cold water pumping, provided its joints are opposite each other, forming a continous sleeve. Cold water always acts as a lubricant for packing, and no trouble should be expected from packing in cold water pumps providing it is not squeezed to tightly.

Service Determines Type

By A. B. Pierce
Engineer Water Supply, Southern, Washington, D. C.

In considering the type of packing to be used for reciprocating pumps, the exact type of pump should be considered, particularly as to whether the pistons are packed inside or outside. Inside-packed pumps are for low and moderate pressures, while outside-packed pumps are used for higher pressures. It is uneconomical, and therefore not good practice, to purchase a cheap or inferior grade of packing that will require frequent renewal, with resulting loss of time and money.

Flax packing, made of the best grade of long-fiber roving, and impregnated with waterproof, graphite lubricant, is recommended for cold water, and is successfully used for

outside-packed pumps. The packing recommended for hot and cold water pumps is a good quality of canvas or duck stitched together in laminations, impregnated with a good grade of rubber, and thoroughly compressed. This packing is rather firm, and is excellent for inside packed pumps, but is also made in a hard form for use with extremely hot water.

These types of packing are made in several forms. The flax is made into ring, coil, and spiral forms, while the canvas or duck is made only in ring and coil form. The selection of the most suitable packing to use is generally determined through experience and test, and the best packing obtainable having the qualities desired should be procured. In deciding whether to use the ring, coil, or spiral type of packing, it should be understood that the ring style is more expensive, and that it is necessary to keep a much larger stock of it on hand to meet the needs of the several different piston diameters. The coil and spiral types are less expensive but require more skill and time to fit them correctly. The spiral and coil packing must be cut to fit very closely, and the ends must be tapered so that the following ring will bear evenly on the packing when drawn up snugly by the piston nut. In replacing the ring type it is necessary to place the cuts in the ring so that no cut will be in line with another, thereby reducing the possibility of leakage past the packing.

Stabilizing Highway Crossings

What satisfactory methods can be employed to drain or otherwise stabilize the track at highway crossings at grade? What are their relative advantages?

Location Affects Methods

By J. P. Datesman
Division Engineer, Chicago & North Western, Huron, S. D.

Efficient drainage of highway grade crossings is affected by many factors, and the type of drainage or other form of stabilization to be adopted depends, in large measure, on local conditions.

Some of the more important features to be considered in the preparation of drainage plans are: (1) Type and draining ability of the ballast; (2) type of crossing in place or contemplated, such as, concrete slab, solid concrete, bituminous, metal plate, scrap rail, prefabricated tie or treated timber, ordinary plank, etc.; (3) adjacent topographical conditions, such as, location in cuts, fills, or on level ground; (4) gradients involved, both of the track and highway; (5) subsoil conditions, which include, of course, soil composition and its water-bearing or holding characteristics; and (6) density of highway and railway traffic.

Many types of drainage systems have been installed at crossings, including perforated metal pipe, laid in various patterns under and adjacent to the crossings. In many of these installations intercepting drains of the same material have been placed on all sides of the highway crossing, especially in cases where step gradients were involved. However, I believe that the type of crossing governs the results to be obtained from any drainage system.

Open-face crossings, that is, types which will permit surface water to enter the ballast, are very hard to drain, regardless of the type of drainage installed. The ballast under such crossings, especially if soft limestone, fouls readily and thereby becomes impervious to the free flow of water into any form of drainage system placed under it. Any system of drainage will function longer and more efficiently under ballast which has very few voids, such as a good grade of gravel, because it is only the surface of such ballast that becomes fouled, increasing its ability to shed surface water, while at the same time the ballast as a whole retains its drainability.

Sub-surface drains, either of vitrified or metal pipe, will in many cases become fouled owing to the continued agitation of the material around them as the result of both highway and rail traffic. However, those that are placed under gravel ballast remain clear longer than those placed under soft stone ballast.

The ideal crossing installation, as far as drainability is concerned, is constructed of materials that will shed surface water, and that will not permit the small amount of water that does penetrate below the surface to become impounded, but will drain it in any suitable direction to a catch basin, and thence under the tracks or highway to a suitable outlet.

In the few isolated cases where poor drainage at crossings is the result of water pockets in the track or highway section, either pressure grouting or lateral drains will stabilize the track.

Good Ballast Essential

By William Lindsey
Extra Gang Foreman, Chicago & Illinois Midland, Springfield, Ill.

The first requisite of a smooth-riding crossing is that it contain good ballast. Effective drains must also be installed. But none of this will accomplish its purpose if the shoulders of the subgrade on each side of the crossing are allowed to get higher than the roadbed. Any accumulations of dirt that raise this subgrade should be removed at once. All rail joints within the limits of the crossing should be welded. This produces a smoother-riding track and lessens pumping.

I have also noticed that a tight, prefabricated crossing, installed with flange rails, acts as a "roof," and tends to drain all water toward the ends where it has a better chance to run off, rather than soak into the roadbed under the crossing.

Install Pipes Under Mats

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

Recently, I had occasion to renew several highway crossings at grade which had been installed more than 100 yr. ago. They now carry very heavy traffic. The exterior appearance of all of them indicated that they had been constructed on the premise that a good surface meant a good crossing. However, when they were dug out, they showed that large sums of money had been expended on them at some time in an effort to maintain their good surface.

Only two of them had been properly drained to relieve the crossing area of all accumulated water. One of these well-drained crossings also had a heavy reinforced-concrete mat under the railroad area the full width of the roadway. This crossing did not appear to have had any work done on it below the ties from the time the area had been drained and the heavy mat installed. The other well-drained crossing was supported on large slabs of rock, instead of heavy, reinforced concrete. It appeared not to have had

much, if any, work done on it below the ties for a long time either, although some of the large stone slabs showed slight settlement and a little movement, which may have taken place many years ago.

A third crossing which did not have adequate drainage or bearing on the subsoil gave ample evidence of being extremely costly to maintain without ever obtaining a satisfactory surface area.

From this experience, it would appear that the most satisfactory method of maintaining highway crossings at grade is to install cast iron drain pipes with proper inlets within the track area, heavy clay pipes outside the track area, and a suitable reinforced-concrete mat over them, leaving room for a small sand cushion between the concrete and the bottom of the ties. If this is done the road area can be taken care of in accordance with present specifications for highway construction.

Grouted Ballast Effective

By L. L. Adams
Assistant Chief Engineer, Louisville & Nashville, Louisville, Ky.

Drainage is the first thing to be given consideration in renewing tracks where they cross a highway at grade. If outlets can be provided deep enough, drain pipe should be laid parallel to the track through the highway, with laterals extending under the tracks, as necessary. If good drainage is provided in this way, maintenance of the track across the highway is not such a difficult problem. A number of years ago we had a particularly bad crossing where no outlets for drainage were available. This problem presented here was solved by digging a large hole adjacent to the track and the highway, back-filling it with cinders, and allowing the drain pipe to empty into it. This installation was made over 20 years ago, and at the last inspection was still functioning satisfactorily.

Where the highway is heavily traveled, especially by large trucks, it is necessary that a solid foundation be provided for the asphalt paving. A very satisfactory method of affording this is to first surface the track on clean rock ballast to the tops of the ties and then thoroughly grout the ballast to a depth of at least 12 in. below the bottoms of the ties.

To be able to maintain a crossing economically, it is necessary that as much of the surface water as possible be drained away so that it cannot penetrate into the ballast. Since this drainage is most likely to occur at flangeways, I prefer to use treated crossing plank, both inside and outside of the running rails. Set the plank on the outside about two inches from the head of the rail, and then thoroughly fill the space between it and the rail with an asphalt mixture. On the outside, the asphalt is carried up to the top of the rail, but on the inside it is brought up only to the bottom of the flangeway. The use of planking on the outside of the rail seals the crossing better than asphalt alone.

Another method which we have found satisfactory is to surface the track with an asphalt mixture for a depth of at least four inches below the bottoms of the ties. After this has become thoroughly packed, it will satisfactory seal the crossing and prevent mud from working up through the ballast.

Any satisfactory method of stabilizing track at a grade crossing will be expensive, but if satisfactory results of a relatively permanent character can be obtained, the extra expense is well justified.

When To Discard Wire Rope

What considerations determine when a wire rope should be discarded? Does the size of the rope or the service in which it is being used make any difference?

Broken Wires Give Warning

By E. L. Klinger
Research Engineer, Wickwire Spencer Steel Division, Colorado Fuel & Iron Corp., Palmer, Mass.

Three main deteriorating factors act upon a wire rope which ultimately result in its being removed from service. These factors may be briefly enumerated as follows: (1) Metallic fatigue caused by bending, which breaks wires on the crowns of the strands; (2) abrasion, resulting in metal being worn from the crowns of the wires, thereby reducing the metallic area; and (3) corrosion, usually evidenced by rusting, discoloration, or pitting of the wires.

A wire rope is a safe part of any machine due to the fact that fatigue, abrasion, and corrosion normally result in fractures and wear on the wire crowns, so that the condition of a rope may be quite accurately evaluated by visual inspection.

In most cases, corrosion is not an important factor in the deterioration of a wire rope. Where corrosive elements are known to be present, such as where a mine rope is in contact with acid mine-water, or a rope is operating in an atmosphere containing corrosive elements, extra precautions can be taken to minimize the effect of this condition. Proper and regular lubrication performs a very important function in protecting the rope from corrosive elements.

The size of the rope makes no difference in the factors influencing the removal of the rope unless the size is such that it has a low operating safety factor. Where the rope is found to operate under an inadequate safety factor, it should not be permitted to reach the same stage of wear and wire-breakage as might be permitted in circumstances where the safety factor is fairly high.

The service in which the rope is used must be considered when retiring it from service. In some types of service, such as drag scraper operation, the wire rope may be permitted to operate to failure. On the other hand, where danger to life and property is involved, the rope should be removed before inspection shows it to be in an unsafe condition.

Rigid and regular inspection of rope for wear and broken wires, and a correct retirement practice based upon the safety factor and possible hazard to life and property, will result in the safest and most economical wire rope service.

Remove When Strands Break

By F. F. Zavatkay
Special Assistant to Engineer Maintenance of Way, New York, New Haven & Hartford, New Haven, Conn.

The service in which a cable is being used does have a bearing on when it should be discarded. However, the real determining factor is whether or not the wire strands become broken. The cable should be discarded whenever such wires break, unless the broken wires are located near the end of the cable so that the damaged section can be cut off and still leave sufficient cable on the drum to perform normal operations safely.

Turning partly-worn cable end for end in the drum will definitely prolong its service life. In some services, a cable that has a worn section that is only 25 per cent of its length can be spliced to get useful service from the remaining good portion. A cable that is approximately half worn can be

replaced and cut into sections for use as tow cables, or for tying down equipment loaded on cars for shipment. Worn wire rope can also be salvaged and cut into short pieces for use in making wire brushes.

No successful method of reclaiming cable has ever been brought to my attention, but I do believe many uses can be found for wire rope that has been removed from service.

Type of Service Governs

By R. B. Chapman
Supervisor Work Equipment and Welding, Southern Pacific, San Francisco, Cal.

The first indication of wear of a wire rope will be broken wires on the side of the rope that bears on the sheave. These breakages are a function of the number of times the rope has been bent and straightened while in service. A reverse bend will usually start the breaking of the individual wires of a rope much quicker than a simple blend.

It is our practice to change the boom-hoist rope as soon as any broken wires appear. The load line need not be replaced quite so soon, but this depends on the work being performed. If a crane is engaged in light work, such as handling light materials, or operating a clamshell bucket, the hoisting rope may be allowed to show greater wear. The hoisting cable on shovels may be used until broken, as this will invariably occur when the greatest power is being exerted, or when the bucket is in upward motion through the bank. At that time, fortunately, no hazard exists.

This policy is followed regardless of the size of the rope which, in each instance, is determined by the amount of power that it is possible to exert on it. I am not aware of a single instance where the breaking of a cable has caused an accident in circumstances where this policy has been followed.

Fire Protection at Wrecks

When necessary to work around derailed or leaking cars containing gasoline or other inflammable commodities, what special measures or precautions should be taken?

Many Precautions Required

By A. E. Davis and J. E. Slaven
Superintendent and Assistant Superintendent of Safety, Respectively, Chicago, Burlington & Quincy, Chicago

When a collision or derailment occurs involving cars containing gasoline or other inflammable commodities, it is essential that prompt cautionary action be taken to safeguard the property against fire or explosion. Guards should be posted immediately to keep spectators a safe distance from the scene, not only for their own personal safety, but as a safeguard against unintentional acts which might cause fire and further loss and damage. Both fire-fighting forces and law-enforcement officers are well schooled in the appropriate procedure for such an emergency, and should be summoned to assist in policing the premises. Some communities have well-trained civilian groups that can and do render effective assistance in emergencies of this character.

When fire occurs in the immediate vicinity of derailed or leaking cars containing inflammable commodities, other cars should be removed promptly, thereby confining the fire area to the narrowest limits possible. To prevent the spread of fire by the flow of burning liquid, holes should be dug or earthen dikes built in its path. Sand, dirt, or wet blankets can be used to good advantage to smother the fire. If available, foam or carbon dioxide fire extinguishers should be used. Water is of very little benefit in fighting fires of this character as it will float the liquid and thereby cause the fire to spread.

All persons should avoid standing in a direct line with red-hot spots visible on the sides of burning tank cars, as such spots may open and cast forth streams of liquid or burning vapor, inflicting serious burns.

Too much emphasis cannot be placed on the importance of taking every possible precautionary measure to guard against vapors becoming ignited. Vapor from gasoline and other inflammable commodities will spread over a greater area than the liquid, and will travel faster, especially if there is any wind. Moreover, vapor cannot be confined; will ignite in contact with a spark or flame; and will burn rapidly, with violence and intense heat, back to the liquid surface from which it originated.

For these reasons, it is extremely important that fires and open-flame lights, such as switch lamps and oil burning lanterns, be extinguished to prevent vapors from igniting. Smoking in the vicinity of escaping vapors is dangerous, and should be prohibited. Where lights are necessary, only electric flash lights or electric hand lanterns should be used. Where it is possible to do so, it is advisable to work on the windward side. Since vapors may travel several hundred feet, checks should be made to be certain of the area likely to be affected. In that area the same precautionary measures should be taken as those applied in the immediate vicinity of the damaged equipment to avoid igniting the vapor.

Inflammable liquids leaking from cars should not be permitted to flow into sewers or waterways because of the danger of vapors becoming ignited at some distant location, causing property damage, or contaminating water with injurious effects to livestock. When possible, leaks should be stopped by the use of wooden plugs.

When rerailing or otherwise handling tank cars, whether empty, or loaded with gasoline or other inflammable commodities, all cables and slings should be wrapped with burlap or canvas to avoid metal against metal contact which might create sparks. If it is necessary to use acetylene torches to burn bent and twisted parts of damaged tank cars, great care must be used to prevent vapors becoming ignited. Such work should be performed on the windward side. Before torches are used, leaking parts should be covered with wet burlap or canvas, and all gasoline-soaked earth should be covered with fresh dirt, sand, or cinders. Empty tank cars should be thoroughly steamed out before any welding or burning operations are started. If it is necessary to transfer an inflammable liquid from one car to another, both cars should be grounded to prevent sparks.

Pamphlets Nos. 22 and 22A, issued by the Bureau of Explosives, Association of American Railroads, set forth certain "recommended good practices" in handling collisions and derailments involving explosives, gasoline and other dangerous articles, both in open areas and in tunnels. Copies of these pamphlets should be furnished supervisors, car foremen, wrecking foremen, and others whose duties require their services at derailments. In addition, representatives of the Bureau of Explosives are located throughout the United States—men who are experienced in the safe method of handling dangerous commodities. Their services are available both to shippers and carriers for the asking. The excellent record made by rail carriers in the handling of explosives, gasoline and other dangerous articles is due, in part, to the valuable assistance rendered by these men.

Insulate Wire Ropes

By G. S. Crites
Division Engineer, Baltimore & Ohio, Baltimore, Md.

The gases and fumes leaking from cars containing inflammables are heavier than air; will accumulate near the surface of the ground, and will flow downward, either on the surface, or in channels. Therefore, there will be a concentration of gases in channels and low pockets within the contaminated area. Every precaution must be taken to prevent a spark or flame from coming in contact with the inflammables within these low places, otherwise there may be a disastrous explosion. Once ignited, flames may follow flowing fluids for great distances.

In handling derailed cars containing inflammables, it is essential to use wire ropes which have been insulated, by jute bags or other suitable material, at the point where they come in contact with the metal cars. Chains must not be used in handling such cars, as sparks may be generated between the links, even if an endeavor is made to insulate the chains from the metal of the car.

There need be no fear of handling derailed or leaking cars containing gasoline or other inflammable commodities providing proper precautions are taken.

Special Tools for Turnouts

What, if any, special tools are required or desirable for the installation and maintenance of turnouts? Why? Do interlocked switches require different tools?

Many Tools Helpful

By N. F. Alberts
General Foreman, Chicago, Milwaukee, St. Paul & Pacific, Chicago

While a turnout is a part of the track structure, its installation and maintenance involve the use of certain tools that are not used commonly in the handling of ordinary track work. I would say that obtaining a rail bender, preferably of the hydraulic-jack type, becomes the first consideration in choosing tools for the handling of turnout work, for it is only by the use of such a tool that the correct bend can be put in the stock rail. A power rail drill, with an adequate supply of bits of various size, is necessary to drill the holes in stock rails and short rails, and for installing guard rail fastenings.

Marking templates are very useful in correctly indicating the center of each hole that must be drilled. A center punch can be used with them to mark the web of the rail at the exact spot for guard rail and stock rail drillings.

Socket wrenches of various sizes are needed to tighten adjustable braces, reinforcing bolts, clip bolts, and switch and connecting-rod bolts. A special track wrench is often needed to handle the guard rail bolts which are larger than standard track bolts.

Timber-carrying hooks are necessary in addition to the usual tie tongs, to handle the heavy, long switch ties. A light power or hand wood-drill helps in drilling holes in the headblocks for fastening the switch stand. One of the smallest tools used in turnout maintenance is also one of the most useful. This is the knobbed spike puller, without which it is extremely difficult to pull the spikes between the guard rail and the running rail, or between the lead and running rails just back of the heel of the switch.

Interlocked switches do not require any different tools for their installation than other switches do. However, their maintenance does require that the end posts in insulated joints be changed from time to time. In extremely warm weather, even though the track is well anchored, it is often difficult to remove the old end post and insert the new. In such cases, we have found a rail expander of great value in providing expansion which will permit the easy insertion of the new end post.

Finally, after a turnout has been in service for a few months, it will probably work slightly out of line. In this case it is difficult to restore the alinement with lining bars, but lining jacks will be found effective for doing this type of work.

Special Tools Are Needed

By R. H. Gilkey
Division Engineer, Central of Georgia, Savannah, Ga.

Special tools are very desirable in the installation of complete turnouts. Of course the standard tools, such as spike mauls, claw bars, track gage, foot adz, track shovels, and wrenches are required, but special tools, such as a good power rail saw, a power drill, and a rail bender should be available. By the use of such tools the work can not only be speeded up but will produce a more polished job.

For the maintenance of such turnouts, the trackmen should be provided with several wrenches to fit the bolts used in the heel blocks and frogs. If compression clips are used, a clip wrench should be provided also. When working on interlocked switches, trackmen should also be given a small bonding drill.

All such tools should be kept in order, and should be placed at a convenient location outside of the track for ready use. After being used, they should be returned to the same location so that other members of the gang can have access to them, thereby avoiding the confusion that loses time in looking for tools. To assist in this detail, all surplus material should be kept separated at one side and not left under foot, thereby reducing the danger of an accident.

Flooring In Car-Wheel Shops

What kind of flooring should be used in a car-wheel shop? Why? Can concrete be used? If so, how can it be processed to protect it from damage or undue wear?

Treated Gum Wears Well

By A. B. Fowler
Superintendent of Construction, Erie, Cleveland, Ohio

The type of floor that should be used in car-wheel shops is a highly controversial subject for which a satisfactory solution is probably still in the offing. Floors in car-wheel shops are subjected to unusually severe wear that calls for special treatment ranging into several different types of construction. The particular type to be selected often depends largely upon the probable length and kind of service that will be demanded of it.

Experience has proved that the ordinary types of concrete floor will not meet these requirements. While there are several different kinds of metallic finishes on the market that will improve and prolong its wear resistance, none of them, to date, can be regarded as entirely satisfactory.

Treated gum wood used as a wearing surface has possibilities, and is being more widely used. This ma-

terial provides an excellent cushion for the sub-base; is exceedingly tough, and has remarkable resistance to wear. In some instances, steel grids filled with concrete have been used with satisfactory results.

Cast Iron Plates Used

By W. A. Huckstep
General Building Supervisor, Missouri Pacific, St. Louis, Mo.

The handling of car wheels, because of their heavy, unbalanced weight, involves an ever-present possibility of personal injury. Hence, in considering the type of floor or platform on which car wheels are to be handled, one must eliminate any type of surface which initially is, or later may become, very smooth. Such a floor not only permits wheels to slip and skid, but also presents an insecure footing for workmen handling the wheels.

Generally, heavy floors of either untreated oak, or treated hard or soft woods supported by wood sleepers, have been used. While the treated material ordinarily has a longer life than untreated material, neither can be considered satisfactory from the standpoint of durability. However, wood seems to be used more or less universally by railroads.

On the other hand, one car-manufacturing company has used sectional cast iron plates resting in a bed of sand as a flooring in its wheel shops and platforms for many years. These plates are irregular in shape, roughly measuring 20 in. by 40 in.; are 1 in. thick; and have 21 holes cast into them, 2 in. in diameter on 5 in. centers. The irregular sides are formed by reverse curves of 3¾ in. radius, providing a convenient method of interlocking adjacent plates. The sand in which these plates are embedded permits them to be placed and leveled quite easily. This type floor has proved satisfactory and much more durable than any other type. While it is appreciably more expensive to install, the cost is lessened to some extent by pouring the plates from cast iron scrap which accumulates during foundry operations.

Communication Structures

What type structure is best adapted to the needs arising from the use of the more recently developed types of communication, such as talk-back loud-speaker systems, space radio, etc.? What special features should these structures possess? Why?

Towers Are Effective

By Assistant Architect

One would think that the use of the new methods of communication, such as inductive systems, space radio, and talk-back loud-speakers, would so add to the effectiveness of a yardmaster's supervision that he could "hole up" anywhere and never come out. On the contrary, were such equipment to be placed in an old yardmaster's office where he could see perhaps only one crew at a time, he would find that the new ease of communication would be more advantageous to his crews than to himself, and they would soon be ahead of him, waiting on his orders. He might often be wasting his time and theirs, paging a crew that was not in position either to answer his summons or listen to instructions.

Therefore, in order for the yardmaster to take full advantage of the inherent benefit of these new methods of communications, he must first be able to see what is going on. The best place to do that is in a tower. But will any old tower do? No! If you are going to give the yardmaster expensive methods of communication you should also give him the means of making those methods as efficient as possible.

In order to satisfy these requirements, the tower must incorporate certain fundamental features. First, it must be high enough, and so constructed as to afford an unobstructed view of the part of the yard involved. Second, it should be fire-resistant, so as to prevent damage to the expensive communication equipment. Third, it must have sufficient room on the top floor for office space and the control machines. Fourth, the working area should be soundproofed by acoustic material and double-pane windows. It is also helpful to have wide, overhanging eaves and special glare-reducing and heat-absorbing glass in the office area to ease the eye strain of the operators. Furthermore, because noise must be reduced, windows must be kept closed. Therefore, the control room must be force ventilated or air conditioned. Finally, to improve the handling of the large amount of "paper work" necessary in any large yard, a pneumatic-tube system should be installed to transport freight bills, yard checks, etc., between the tower and the general yard office.

Combine all these features with functional architecture and you get the modern communication tower with its glass enclosed working area, its outside platforms so those windows can be washed, and its wide sun-shading eaves. It may be made of brick and concrete, of steel frame and asbestos shingles, or any other fire-retardant materials, but in any case it is a boon not only to the leg-weary yardmaster who formerly had to try to be many places at the same time, but to the other division and general officers charged with the responsibility of efficient yard operations.

Towers Aid Yardmasters

By General Building Supervisor

The tower is the best basic type of structure which can be adapted to the needs arising from the use of the more recently developed systems of communication, especially where they are used exclusively in yards. In such cases a panoramic view of yard tracks and facilities aids in obtaining the benefits of modern communication.

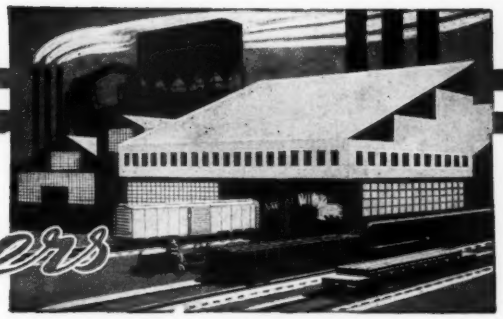
The top floor of the yard communication tower contains the control equipment, and sufficient area for office space. Windows generally surround the entire room so as to give the operator an unobstructed view in any direction. These windows are usually tightly sealed to eliminate noise; are double-paned to absorb heat, and are often slanted to reduce glare. The fact that they cannot be opened requires: (1) That a platform or balcony be built around the tower so they can be cleaned; and (2) that the room be air conditioned. Wide eaves assist in glare-reduction by shading the windows from the sun.

Since the communication equipment is expensive and, once installed, quite essential to uninterrupted yard operation, it is imperative that the building be made as fire-resistant as possible.

Unless local conditions prescribe that the structure be ornamental as well as useful, it should be built in such a manner that it can be moved at a justifiable cost.

The greatest benefits accrue from the use of modern communication facilities in large yards where several yardmasters have jurisdiction over different sections of the yards. The towers in such cases can be connected by pneumatic-tube systems to the general yard office for the convenient transmission of office reports, etc.

PRODUCTS of Manufacturers



(For additional information on any of the products described in these columns, use postcards, page 645)

New Airco Electrode

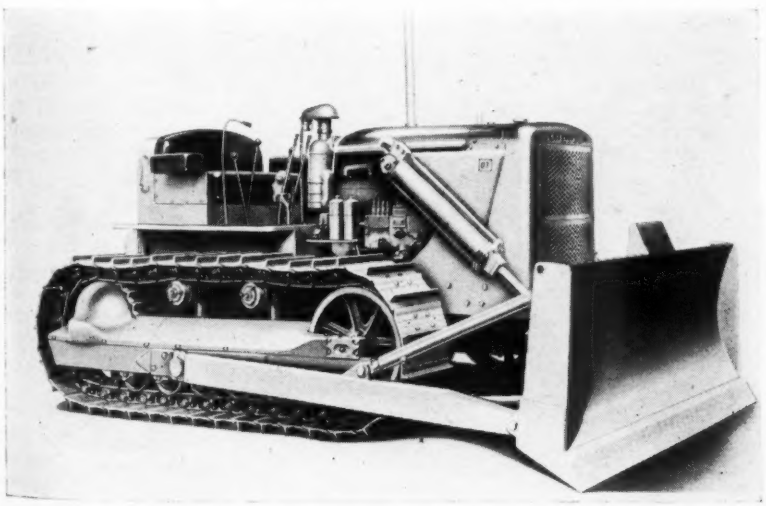
AIR Reduction Sales Company, New York, has announced the Airco No. 375 electrode for machinable welds on cast iron. The company reports that the high nickel content of the new electrode promotes easy flow and sound deposits, and produces a weld and fusion zone which is soft and easy to machine. The new electrode, which may be used on either alternating or direct current is available to the trade in diameters of either 5/32 in. or ⅛ in.

Hydraulic Bulldozers

A LINE of hydraulically-controlled bulldozers is being offered by the Caterpillar Tractor Company, Peoria, Ill., in addition to its present line of cable-controlled bulldozers. The new bulldozers are available in four sizes, including blades of both the straight type and the angling type for use with the Caterpillar Diesel D8, D7 and D6 track-type tractors, and a straight-type blade for the D4, and are matched in capacity to the power of the several tractors for which they are designed.

Features of the Caterpillar hydraulic system, as outlined by the manufacturer, are: Front-mounted, positive-action, balanced-vane pump, integral with tank and operating valves; manually-operated three-position valve with raise, lower and hold positions; non-corrosive Parco-lubrite treatment of the interior steel surfaces of the entire system, for maximum operating efficiency and wear resistance; carburized pins connecting the pistons and push arms to provide longer life; rapid blade action; a heavy steel guard protecting the front-mounted hydraulic pump housing, and the use of high-pressure hydraulic hose, reinforced with two plies of steel wire, offering resistance to heat, oil and the elements while maintaining high flexibility under relatively high temperatures.

The hydraulically-controlled bulldozer is similar in design to that of the cable-controlled type. It has the curved moldboard of multiple box-section design, and reinforced box-section push arms or "C" frame. The hydraulic cylinders are mounted over the push arm or "C" frame, alongside a new, specially constructed engine and radiator guard for the D6, D7 and D8 tractors, while the cylinders on the D4 are mounted on brackets alongside the operator's seat with power transmitted to the push arms through connecting triangular cranks. These hydraulic bulldozers, it is said, offer a high degree of visibility for operation and also provide greater ease and rapidity of blade pitch and angling adjustments.



Caterpillar Hydraulically-Controlled Bulldozer, Mounted on a Model D7 Tractor

Axial Air-Gap Motor

FAIRBANKS, Morse & Co., Chicago, has announced the manufacture of a new line of alternating-current electric motors, to be known as Axial Air-Gap motors, ranging in size from 1/3 hp. to 10 hp. These motors are suitable for horizontal, vertical, or flange mounting, or they may be mounted on angle bases for belt drives. Outstanding features of the new motor are its relatively small size and weight; it is said to be less than half the size of a conventional motor of comparable rating and to weigh approximately 30 per cent less. Yet it is reported to retain all the necessary performance characteristics and power requirements. Other features include adaptability for use with two-phase or three-phase power, simplicity and speed of inspection, cleaning and lubricating, a cooler rotor and greater adaptability as a flange-mounted unit for use on lathes or other machine applications.

The Axial Air-Gap motor is distinguished by the fact that the magnetic lines of force follow a path parallel to the shaft (axis of rotation) as compared to the radial path followed in the conventional motor; in other words, instead of having the rotor concentric with the stator, the rotor is somewhat larger in diameter—approximately equal to that of the stator—and is mounted so that the faces of the stator and the rotor are immediately adjacent, separated by a narrow air gap. The rotor is mounted on one end of a shaft, which also extends through the stator core, the shaft being held in place by bearings and supported by the stator frame. This prin-

ciple of design is not entirely new, but Fairbanks-Morse, through newly-developed manufacturing techniques, has made the design commercially practicable.

The stator and rotor cores of the new motor are made of strip steel which is coiled in the shape of a thick disk. Slots for the windings are prepunched in the steel before coiling in such a manner that, when the coil is completed, the slots line up in straight lines. The rotor windings are centrifugally cast into the core slots with molten copper rather than being wound with wire. This construction results in a one-piece unit which is said to possess the added strength required by the relatively large diameter of the rotor. Windings for the stator are of wire, inserted into the slots in the core.

The new motors may be obtained as vertical or horizontal units as desired for direct connection or with chain,

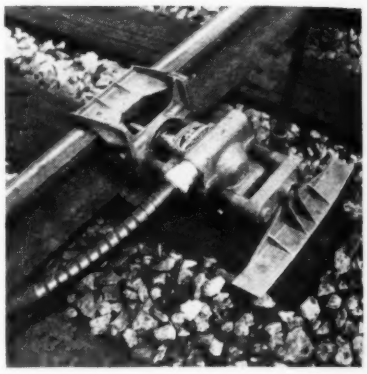
The Motor on the Right Is a Fairbanks-Morse Axial Air-Gap, 5-Hp. Vertical Motor, While That on the Left Is a 5-Hp. Unit of the Conventional Type

belt, or V-belt drives. A pivot base, with three-point suspension, is provided for chain or belt drives, eliminating the need of a sliding base, belt tension being adjusted by pivoting the motor about the top supporting screw. The motor may be attached directly to the frame of a machine, thereby eliminating the base entirely.

The Axial Air-Gap motor is not intended to supersede or displace the conventional motor except in instances where savings in size and weight are important. It is said to be ideally suited for use where the motor is mounted as an integral part of the unit, and for vertical applications where height is important.

Mall Rail Drill

THE Mall Tool Company, Chicago, has added a lightweight rail drill to its line of attachments designed for use with the Mall gas-engine, portable-grinder power unit. The new drill is



Above—The Drill in Operation, Showing Portable Grinder Power Unit. Right—Close-Up of the New Mall Rail Drill Attachment

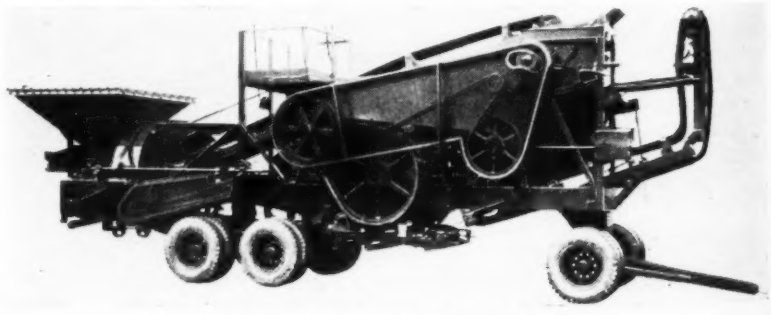
23½ in. long, weighs 43 lb. and is equipped with a gear reduction of 38 to 1 for breaking down the power unit speed to one of 75 r. p. m. at the bit end of the drill. A Celfor chuck is used, which may be quickly adjusted for all sizes of bits up to 1⅜ in. In addition, a geared feed bar is provided to bring the bit flush with the rail and keep it moving steadily through the work. A new handle clamping device, for clamping the drill to the rail, is said to eliminate the need of center punching.

Due to its small size and light weight, the drill is said to be particularly adapted for work in and around switches; it may be easily removed for the passing of trains, and as easily reapplied at the same location. With the new drill, the time required to drill a 1 1/16-in. hole in 100 or 112-lb. rail is claimed to be less than a minute.

Portable Gravel Plant

THE Pioneer Engineering Works, Inc., Minneapolis, Minn., has announced the development of a portable gravel plant known as the 34-S Continuflo. This plant contains a 1024 jaw crusher, equipped with SKF bearings; a 24-in. by 16-in. roller crusher, equipped with Timken bearings; and a 3-ft. by 8-ft. 2½-in. vibrating screen, equipped with a sand screen. The unit is fed through a 7-ft. hopper, all equipment being mounted on a single, pneumatic-tired chassis. Steel center cord V-belts drive the units from power mounted on the plant, or from an optional drive through a power take-off on a tractor.

Mounted on six sets of dual 9:00-by-20 tires, and having a travel length of 41 ft., overall height of 12 ft. 6 in. and weighing approximately 40,900 lb. without the power unit, the gravel plant is said to meet state highway requirements for weight and dimensions. Due to its portability, the plant



The New Pioneer 34-S Continuflo

(For additional information on any of the products described on this page, use postcards, page 645)

is said to be particularly adapted for quick, short moves where material is required in a hurry. The plant is designed for two-man operation, one on the dragline or shovel feeding material, and one on the plant.

Single Rear Tires For Wheel Tractors

THE Industrial Power division of International Harvester Company, Chicago, has announced the development of single rear tired wheels for use with Models I-9 and ID-9 of its industrial wheel tractors. Designed for off-the-highway hauling, the single, large 18.00-by-26 rear tire eliminates the ridge normally left by the dual-wheel arrangement. This action, it is claimed, allows trailing equipment to follow in the tracks of the tractor without incurring any difficulty in steering or other attendant operations. The new single wheel and tire are said to give the same tread surface as the dual-tired units, thereby maintaining the maximum drawbar power under similar operating conditions.

The International ID-9 Industrial Wheel Tractor Equipped With the New Single Rear Tired Wheels

Bulldozer Excavator

A NEW combination dragline, clamshell, and crane, known as the Hystaway, designed for installation on the D6 and D7 models of Caterpillar track-type tractors, is now being offered by the Hyster Company, Portland, Ore.

The unit is mounted at the rear of the tractor. With this mounting, it is said, utility bulldozing and full-track oscillation are available on a standard tractor, with track rigidity, if desired, secured by turning a crank at the mast-head. It is claimed that, after the initial installation, the unit may be removed in one hour, and remounted in two hours, permitting the use of the bulldozer for full-production bulldozing or drawbar work, thus minimizing equipment tie up.

Advantages claimed for the unit include its ability to operate in restricted locations, and to perform small jobs where larger units might be unprofitable. The mounted unit may be transported by flat-bed trailer, without additional vertical clearance being required for the bulldozer, or, when unmounted, it can be transported to and from the point of work in dump trucks.

The Hystaway Operating as a Dragline

Portable Roller

LITTLEFORD Bros., Inc., Cincinnati, Ohio, are now offering their Trail-O-Roller, Model 155, in the railroad field, this being a motorized portable roller designed for the economical rolling of railroad crossings, platforms, shoulders, parking areas, driveways, and patchwork of all types. The Trail-O-Roller can be trailed behind a truck; a patented hydraulic control that raises and lowers the main roller is claimed to permit changing from the trailing position to the rolling position, or vice versa, in two minutes.

The rear roller of the Trail-O-Roller provides a compaction of 145 to 150 lb. per inch of roller; the front roller provides a compaction of 40 to 50 lb. per inch. The main roller, 24 in. wide and 32 in. in diameter, is a semi-steel casting with a machine finished surface. The front roller, 18 in. in diameter, is of the split type, which is said to promote easy steering. Anti-friction roller bearings are used on both rollers.

Power is furnished by a single-cylinder, four-cycle, air-cooled engine, and the transmission provides two speeds forward and one in reverse. Forward and reverse speeds are adjustable from 1½ to 2 m.p.h.

The Trail-O-Roller at Work on a Highway-Railroad Grade Crossing

Portable Arc-Welder

THE Hollup Corporation, Chicago, a division of the National Cylinder Gas Company, has developed a new portable, gas-driven arc-welder known as the "Sureweld". In this welder, the

(For additional information on any of the products described in these columns, use postcards, page 645)

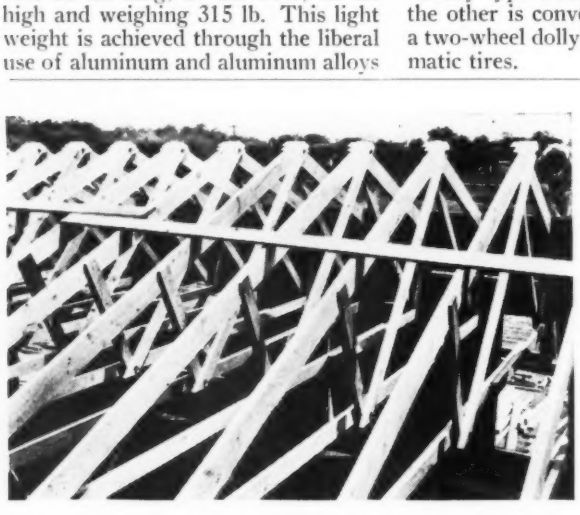
The "Sureweld" Portable Arc-Welder Welding a Frog

engine-generator unit, manufactured by D. W. Onan & Sons, Inc., Minneapolis, Minn., consists of a four-pole, self-exciting generator with interpoles, directly connected to a four-cycle, two-cylinder, opposed-type, air-cooled gas engine, forming a compact unit 32 in. long, 26 in. wide, 28 in. high and weighing 315 lb. This light weight is achieved through the liberal use of aluminum and aluminum alloys wherever practical in the construction of these machines.

Equipped with two receptacles for emergency lighting cords, and using electrodes up to and including 5/32 in. and certain types of 3/16 in., the welder is rated at 150 amp. at 30 volts on a 50-per cent duty cycle, and is said to have exceptional arc stability with economy of operation.

Due to its light weight and compact design, the "Sureweld" is said to be easily transported on the job, and between jobs by a light truck or, in some cases, in the trunk compartments of passenger automobiles. Its portability is said to permit normal operation with but 20 ft. of cable, resulting in a minimum loss of amperage, and to make the unit particularly suited for isolated areas beyond the reach of power lines and in building construction.

The "Sureweld" is available in two models, one of which is of the stationary type with guard frame, while the other is conveniently mounted on a two-wheel dolly equipped with pneumatic tires.



An Application of the Teco Trussed-Rafter Roof Truss

Lightweight Timber Roof Truss

A LIGHTWEIGHT trussed-rafter roof truss for use in small buildings, such as tool houses and storage sheds has been developed by the Timber Engineering Company, Washington, D.C. Designed to be spaced on 24-in. centers, these trusses afford clear spans of 20 ft. to 30 ft. without interior posts or partitions and can be framed and erected in a relatively short time.

The framing of the new truss is said to be remarkably simple and to require only conventional sizes of lumber, which are fastened with Teco split ring connectors

It is said that only four basic members are incorporated in each truss, a feature which makes for rapid and economical fabrication, either in the shop or in the field.

No special wall framing is said to be required for these trusses as they can be seated on ordinary stud walls to which they can be anchored with Teco Type-A framing anchors. The trusses are designed to support a combined load of 45 lb. per sq. ft.

New Book

Safety Manual

ACCIDENT Prevention Manual for Industrial Operations. 534 pages. 8¼ in. by 5¼ in. Bound in cloth. Illustrated. Published by the National Safety Council, 20 N. Wacker Drive, Chicago 6. Price to members of the National Safety Council $7. To others $14.

THIS manual is a comprehensive source of the "how" of safety and sets forth the principles of safety for the activities that are encountered in the great majority of industrial operations. It carries these principles into as much detail as possible without contradicting the premise that the application of accident prevention methods to a specific job must remain the responsibility of the engineer. The manual is intended to be kept at hand for frequent and ready reference by the safety director, the safety engineer and the foreman.

Among the subjects discussed are plant layout and design, construction and demolition of buildings and other structures, the inspection, maintenance and operation of permanent buildings and facilities, guarding and operating machinery, and handling and storing materials. A considerable section of the book is devoted to a discussion of electrical, chemical, fire and explosive hazards, and the handling of inflammable liquids. Others discussed are the care and use of hand and portable power tools, the operation of vehicles, the use of personal protective equipment, and industrial hygiene. Finally the book suggests methods for a well-organized safety program, and gives in its closing pages a resume of the services and activities of the National Safety Council.

Its thorough coverage of the subject and the detail with which it discusses hazards and the means of overcoming them, make the book of value to all concerned with safety.

(For additional information on any of the products described on this page, use postcards, page 645)

Changes in Railway Personnel

Engineering

R. J. Bruce, track supervisor-assistant engineer on the Missouri Pacific, has been appointed assistant engineer, with headquarters at Wichita, Kan.

W. C. Wilder, structural draftsman on the Boston & Maine, has been appointed assistant engineer-structural, with headquarters at Boston, Mass.

J. K. Waitt, real estate agent of the Seaboard Air Line, has been appointed valuation engineer, with headquarters as before at Norfolk, Va., succeeding **T. W. Roby,** promoted to chief of research and planning.

R. K. Johnson, supervisor of reclamation of the Chesapeake & Ohio, has been appointed to the newly-created position of superintendent of work equipment and reclamation, with headquarters as before at Barboursville, W. Va. **W. H. Sims** succeeds Mr. Johnson as supervisor of reclamation.

J. B. Wilson, division engineer on the Georgia, has been appointed chief engineer, with headquarters at Atlanta, Ga. **C. S. Joseph,** principal assistant engineer, has been appointed consulting engineer, at Atlanta. **W. R. Peck,** engineer maintenance of way, has been appointed principal assistant engineer, with headquarters as before at Atlanta.

F. L. Nicholson, chief engineer of the Norfolk Southern, with headquarters at Norfolk, Va., has retired, at his own request, after 57 years of service with this road. **M. C. Jennette** has been appointed engineer maintenance of way, with jurisdiction over engineering and maintenance of way and structures, with headquarters at Norfolk.

C. E. R. Haight, engineer of track on the Delaware & Hudson at Albany, N.Y., has been appointed division engineer, with headquarters at Plattsburg, N.Y., to succeed **W. J. H. Manning,** retired. **C. W. Reeve,** bridge and building supervisor at Oneonta, N.Y., has been appointed engineer of track at Albany, to succeed Mr. Haight.

D. E. Rudisill, engineer maintenance of way of the Western Pennsylvania division of the Pennsylvania, at Pittsburgh, Pa., has been appointed chief engineer maintenance of way of the New York Zone, with headquarters at New York, succeeding **Robert R. Nace,** whose death on May 19 was reported in the June issue. **C. R. Bergman,** division engineer, Chicago Terminal division, has been promoted to engineer maintenance of way, with headquarters at Pittsburgh, succeeding Mr. Rudisill. **W. R. Ganser,** engineer maintenance of way and structures of the Washington Terminal, Washington, D.C., succeeds Mr. Bergman as division engineer at Chicago. **George Baylor,** division engineer, Delmarva division, at Cape Charles, Va., replaces Mr. Ganser on the Washington Terminal. **C. R. Uitts,** division engineer, Indianapolis division, at Indianapolis, Ind., has been transferred to Cape Charles, where he replaces Mr. Baylor. **J. P. Zearley,** assistant division engineer, Maryland division, at Baltimore, Md., has been promoted to division engineer at Indianapolis, replacing Mr. Uitts. **N. L. Fleckenstine,** assistant division engineer on special duty at Philadelphia, Pa., succeeds Mr. Zearley at Baltimore.

C. T. Jackson, assistant chief engineer of the Chicago, Milwaukee, St. Paul & Pacific, has been appointed assistant chief engineer, system, with headquarters as before at Chicago. **E. B. Crane,** principal assistant engineer at Seattle, Wash., has been appointed assistant chief engineer, Lines West, with the same headquarters. **A. B. Chapman,** engineer and superintendent of bridges and buildings at Chicago, has been appointed assistant chief engineer, Lines East, with the same headquarters. **H. B. Christianson,** assistant to the chief engineer at Chicago, has been appointed principal assistant engineer, system, with the same headquarters. **B. J. Ornburn,** assistant bridge engineer at Chicago, has been appointed engineer and superintendent of bridges and buildings, system, with the same headquarters, succeeding Mr. Chapman. **E. E. Burch,** squad leader in the engineering department, at Chicago, has been appointed assistant bridge engineer, with the same headquarters.

E. B. Crane

Mr. Jackson was graduated by the University of Missouri with a bachelor's degree in civil engineering. He entered the service of the Milwaukee upon graduation, and his experience has covered location, construction, and maintenance work. Previous to his recent promotion Mr. Jackson served successively as assistant engineer, resident engineer, locating engineer, district engineer, assistant engineer maintenance of way, and assistant to the chief engineer.

Mr. Crane was born at Dexter, Iowa, on March 15, 1882, and received his higher education at the University of Iowa. After a short period of service with another road, he entered the service of the Milwaukee on November 18, 1905, as a resident engineer at Sumner, Wash., and served successively as terminal engineer on construction, assistant engineer construction and maintenance, and assistant engineer maintenance of way, at various points in Washington until 1914. In 1915 Mr. Crane was appointed pilot engineer, valuation department, at Chicago, and served during 1916 and 1917 as assistant engineer in the same department. He was named assistant valuation engineer in 1918, and engineer auditor in 1920. In 1922 he was appointed principal assistant engineer, with headquarters at Seattle, Wash., the position he held at the time of his recent promotion.

Mr. Chapman was born at Elmwood, Neb., on February 24, 1890, and received his higher education at the University of Washington. He entered railroad service in May, 1919, as a structural draftsman on the Milwaukee at Seattle, Wash. From April, 1922 to June, 1929, he served as office engineer at Seattle, and from the latter date until December, 1930, he served as principal assistant engineer on the Seattle Grade Separation Committee. In January, 1931, he was appointed assistant engineer on the Milwaukee, and served in that capacity until April, 1933, when he became a structural draftsman at Chicago, where he was appointed chief draftsman in July, 1938. Mr. Chapman became office engineer at Chicago, in November, 1938. In June 1942 he was appointed bridge engineer, with headquarters as before at Chicago, and in July, 1946, he was advanced to engineer and superintendent of bridges and buildings.

A. B. Chapman

The Gulf, Mobile & Ohio has announced the following appointments of Alton officers in connection with the consolidation of the G. M. & O. and the Alton: **M. D. Carothers,** chief engineer, at Chicago, has been appointed assistant chief engineer, system, with headquarters at Bloomington, Ill. **H. Bober,** bridge and building engineer, at Chicago, becomes bridge and building engineer, system, with headquarters at Mobile, Ala. **J. R. Hoagland,** valuation and office engineer, at Chicago, becomes assistant engineer, system, with headquarters at Mobile. **J. A. Erskine,** assistant bridge and building engineer, at Chicago, becomes assistant bridge and building engineer, Eastern and Western divisions, with the same headquarters.

M. R. Hoagland, office engineer at Chicago, becomes office engineer, Eastern and Western divisions, at Bloomington. **A. F. Kadow,** assistant engineer at Chicago, becomes assistant engineer, Eastern and Western divisions, at Bloomington. **J. J. Ochs,** assistant engineer at Chicago, becomes assistant engineer, Eastern and Western divisions, at Bloomington. **E. M. Unzicker,** division engineer, becomes division engineer, Eastern division, with headquarters as before at Bloomington. **W. H. Stumm,** assistant division engineer at Bloomington, becomes assistant division engineer, Eastern division, with the same headquarters. **E. G. Wall,** division engineer, at Bloomington, becomes division engineer, Western division, with the same headquarters. **R. D. Helwig,** assistant division engineer, at Bloomington, becomes assistant division engineer, Western division, with the same headquarters.

H. C. Charlton, whose promotion to assistant engineer of bridges of the Norfolk & Western at Roanoke, Va., was reported in the June issue, was graduated in civil

H. C. Charlton

engineering from Tri-State College, Angola, Indiana. Mr. Charlton was first employed by the Norfolk & Western as chainman in 1915, serving in that capacity until 1917, when he was furloughed for service with the United States Navy during World War I. Returning to the road in 1920, as rodman, he served subsequently as inspector, draftsman and crossing engineer, holding the latter position at the time of his recent promotion to assistant engineer of bridges.

Track

R. F. Taggart, supervisor of track on the Southern division of the Atchison, Topeka & Santa Fe, has been appointed roadmaster at Silsbee, Tex.

A. S. Evang, roadmaster on the Canadian Pacific at Bassano, Alta., has been transferred to Kneehill, Alta., succeeding **R. B. Plowman,** who has been transferred to Bassano, to replace Mr. Evang.

J. H. Reiter, section foreman on the Chicago Great Western, at Randolph, Minn., has been appointed roadmaster at New Hampton, Iowa, succeeding **C. F. Finch,** who has retired.

W. M. Tharp, supervisor of supplies on the Atlantic Coast Line, has been appointed acting roadmaster, and **E. T. Hobbs** has been appointed acting supervisor of supplies, with headquarters at Rocky Mount, N.C., to succeed Mr. Tharp.

W. E. Bailey, assistant engineer in the chief engineer's office of the Delaware & Hudson, at Albany, N.Y., has been appointed track supervisor, with headquarters at Oneonta, N.Y., to succeed **N. H. Williams,** whose appointment as bridge and building supervisor is reported elsewhere in these columns.

C. W. Reeve, bridge and building supervisor on the Delaware & Hudson, at Oneonta, N. Y., has been appointed engineer of track, with headquarters at Albany, N. Y. **W. E. Bailey,** assistant engineer, at Albany, has been appointed track supervisor, with headquarters at Oneonta.

H. F. Larson has been appointed roadmaster of the Chicago, Milwaukee, St. Paul & Pacific, at Rockwell City, Iowa, succeeding **A. O. Marg,** who has been transferred to Ottumwa, Iowa, where he replaces **P. M. Loftus,** assigned to other duties. **Leon W. Cole** has been appointed roadmaster at Horicon, Wis.

T. L. McGill, assistant roadmaster on the Chicago, Burlington & Quincy, at Chicago, has been promoted to roadmaster, with headquarters at Beardstown, Ill., succeeding **R. P. Johns,** who has been transferred to Chicago, where he replaces **L. E. Flinn,** who has resigned to enter private employment. **W. V. Parker,** roadmaster at Curtis, Neb., has been transferred to Central City, Neb., succeeding **R. Hurlbut,** who has retired. **J. A. Green,** supervisor of track at Wray, Colo., has been promoted to roadmaster at Curtis, replacing Mr. Parker.

J. M. Collins, supervisor of track on the Pennsylvania at Canton, Ohio, has been transferred to Orrville, Ohio, a newly-created position. **M. H. McCully,** supervisor of track at Sharon, Pa., has been transferred to Canton to replace Mr. Collins. **J. L. Spinelli,** supervisor of track at Logansport, Ind., succeeds Mr. McCully at Sharon. **J. W. Diffenderfer,** assistant supervor of track on the Panhandle division at Coshocton, Ohio, has been promoted to supervisor of track at Logansport, succeeding Mr. Spinelli. **D. A. Sempsrott,** assistant supervisor of track at Chicago, replaces Mr. Diffenderfer on the Panhandle division. **W. H. Lindsay,** assistant on the engineering corps, Eastern region, has been promoted to assistant supervisor of track at Chicago, succeeding Mr. Sempsrott.

Paul Reeves, supervisor of track on the Pennsylvania, at Anderson, Ind., has been appointed supervisor of track with special duties, with the same headquarters and **R. E. Miller,** who has returned from a leave of absence, has been appointed supervisor of track, with headquarters at Anderson, to succeed Mr. Reeves. **J. J. Baffa,** assistant branch line supervisor of track, at Jamesburg, N.J., has been appointed assistant main line supervisor of track on the Middle division, with headquarters at Lewistown, Pa., and **W. G. Wells,** assistant on the engineer corps, New York zone, has been promoted to assistant branch line supervisor of track, to succeed Mr. Baffa at Jamesburg. **H. T. Alexander,** assistant supervisor of track at Enola, Pa., has been transferred to the Eastern division, with headquarters at Mansfield, Ohio, to succeed **C. B. Binning,** resigned. **J. P. McIntyre,** assistant on the engineer corps, New York zone, has been promoted to assistant supervisor of track, on the Philadelphia division, with headquarters at Enola, to succeed Mr. Alexander.

Bridge and Building

William J. Lacy, bridge and building supervisor on the Missouri division of the Missouri Pacific, has retired.

N. H. Williams, track supervisor on the Delaware & Hudson, at Oneonta, N.Y., has been appointed bridge and building supervisor, with the same headquarters, to succeed **C. W. Reeve,** whose appointment as engineer of track is reported elsewhere in these columns.

J. J. La Bat, assistant supervisor of bridges and buildings on the Missouri Pacific, at Poplar Bluff, Mo., has been appointed supervisor of bridges and buildings on the Wichita division, with headquarters at Wichita, Kan., succeeding **M. J. Harp,** who has been transferred to Poplar Bluff, to replace **L. G. Byrd,** who died on May 18. **J. W. Carman,** bridge and building foreman on the Memphis division, has been promoted to assistant bridge and building supervisor, with headquarters at Poplar Bluff.

Special

T. W. Roby, valuation engineer of the Seaboard Air Line at Norfolk, Va., has been appointed chief of research and planning, with the same headquarters. A native of Jacksonville, Fla., Mr. Roby is a graduate of Virginia Military Institute and Massachusetts Institute of Technology. He first became connected with the Seaboard Air Line in 1914, when he was assistant engineer in the road's valuation department at Norfolk. Specializing in valuation matters, he was appointed valuation engineer for the system in 1927 and held that post at the time of his recent appointment. Mr. Roby will also assume the duties previously assigned to the executive representative, a position held by the late W. D. Faucette, which will not be re-established at this time. At the time of his death Mr. Faucette also served as chairman of the Committee on Research and Planning, which was originally established in 1943.

Obituary

Jerome M. Carley, assistant engineer-valuation on the Boston & Albany, died recently at his home in Waban, Mass.

William J. Mahoney, supervisor of bridges and buildings on the Louisville & Nashville, with headquarters at Louisville, Ky., died recently.

Association News

Metropolitan Maintenance of Way Club

The annual outing of the club was held on June 10 at the Out O'Bounds Country Club, Suffern, N.Y., at which 100 railroad and 67 supply men were present. The program included such sports as softball, horseshoes, quoits and golf, and prizes were awarded the winners in all activities. A buffet luncheon was served at 1:30 p.m.

Bridge & Building Association

A meeting of the Executive committee will be held in Chicago on July 10, at the Chicago Engineers' Club, 314 S. Federal street, to review preliminary drafts of the technical committee reports to be presented at the annual meeting of the association in Chicago on September 16-18. The annual meeting, as last year, will be held at the Hotel Stevens, Chicago, and will be concurrent with the annual meeting of the Roadmasters' and Maintenance of Way Association and a joint exhibit of the Track Supply Association and the Bridge & Building Supply Men's Association.

The 1946 Proceedings are in the hands of the printer, with the hope that they can be mailed to members late in July or early in August.

Roadmasters' Association

President E. J. Brown has called a meeting of the Executive committee of the association in Chicago on July 14, at the Chicago Engineers' Club, 314 S. Federal street, the primary purpose of which is to review preliminary drafts of committee reports to be presented before the annual meeting of the association in Chicago, September 16-18. The annual meeting, as last year, will be held concurrently with the annual meeting of the American Railway Bridge & Building Association and a joint exhibit of the Track Supply Association and the Bridge & Building Supply Men's Association. The 1946 Proceedings of the association are in the hands of the printer, with the hope that they can be mailed to members sometime in July.

Maintenance of Way Club of Chicago

On the call of President Guy Palmer, a luncheon meeting of the Executive committee was held on June 5 primarily to elicit suggestions for the make-up of standing committees for the year and to make preliminary plans for the fall season, beginning in October.

American Railway Engineering Association

Four committees have scheduled meetings to be held in July, as follows: The Committee on Water Service and Sanitation will meet at the association's headquarters at Chicago on July 10; the Committee on Economics of Railway Labor will meet at Albany, N.Y., on July 15; the Committee on Records and Accounts will meet at St. Paul, Minn., on July 22 and 23; and the Committee on Iron and Steel Structures will meet at Cincinnati, Ohio, on July 30 and 31. On July 16 those attending the meeting of the Committee on Economics of Railway Labor at Albany will be taken on an inspection of continuous welded rail on the Delaware & Hudson, the inspection to be made by means of a special train which will leave Albany at 6:30 a.m., eastern standard time, on the sixteenth, returning at 4:00 p.m.

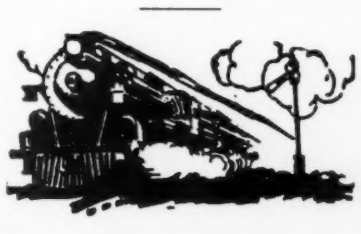
During June the following committee meetings were held: Ties at Grenada, Miss., on June 5 and at Little Rock, Ark., on June 6; Highways on June 10 at Chicago; Economics of Railway Location and Operation on June 21 at French Lick, Ind.; Yards and Terminals at Buffalo, N.Y., on June 23; Rail on June 26 at Chicago; and Impact and Bridge Stresses at Chicago on June 26.

Progress is being made in preparing the proceedings for 1947. It is expected that the press sheets will be delivered to the bindery early in July.

Track Supply Association; B. & B. Supply Men's Association

Eighty companies have already contracted for 133 booths at the joint exhibit of these two associations to be held at the Hotel Stevens, September 15-18, in conjunction with the concurrent annual meetings of the Roadmasters' and Bridge & Building Associations. Among these companies are a considerable number that have not exhibited previously. With exhibit space still available, companies that desire to take part in the exhibit should address Lewis Thomas, director of exhibits, 59 E. Van Buren street, Chicago. Following is a list of those companies that have already planned exhibits:

Achuff Railway Supply Company, St. Louis, Mo.
Air Reduction Sales Company, New York
American Fork & Hoe Company, Cleveland, Ohio
American Lumber & Treating Co., Chicago
Armco Drainage & Metal Products, Inc., Middletown, Ohio
Austin-Western Company, Aurora, Ill.
Barco Manufacturing Company, Chicago
Bernuth Lembcke Company, Inc., New York
The Buda Company, Harvey, Ill.
Chicago Pneumatic Tool Company, New York
Chipman Chemical Company, Inc., Bound Brook, N. J.
Crerar, Adams & Co., Chicago
Cullen-Friestedt Company, Chicago
Dearborn Chemical Company, Chicago
Drinkwater, Inc., Waukegan, Ill.
The Duff-Norton Mfg. Co., Pittsburgh, Pa.
Electric Tamper & Equipment Co., Ludington, Mich.
Fairmont Railway Motors, Inc., Fairmont, Minn.
Gradall Division, Warner & Swasey Company, Cleveland, Ohio
Gravely Ia-Nois Company, Davenport, Ia.
Hastings Signal & Equipment Co., Boston, Mass.
Hayes Track Appliance Company, Richmond, Ind.
Homelite Corporation, Port Chester, N. Y.
Hubbard & Co., Pittsburgh, Pa.
Illinois Malleable Iron Company, Chicago.
Independent Pneumatic Tool Company, Chicago
Ingersoll-Rand Company, New York
Jaeger Machine Company, Columbus, Ohio
Johns-Manville Sales Corporation, New York
O. F. Jordan Company, East Chicago, Ind.
Kalamazoo Manufacturing Company, Kalamazoo, Mich.
The Kershaw Company, Montgomery, Ala.
Koehring Company, Milwaukee, Wis.
The Lehon Company, Chicago
Le Roi Company, Milwaukee, Wis.
LeTourneau Company, Peoria, Ill.
Lima Locomotive Works, Shovel & Crane Div., Lima, Ohio
Link Belt Speeder Corporation, Chicago
Littleford Bros., Inc., Cincinnati, Ohio
Lombard Governor Corporation, Ashland, Mass.
The Lundie Engineering Corporation, New York
Maintenance Equipment Company, Chicago
Mall Tool Company, Chicago
Marvel Equipment Manufacturers, Inc., Chicago
Massey Concrete Products Company, Chicago
The Masters Builders Company, Cleveland, Ohio
Morden Frog & Crossing Works, Chicago
Murdock Mfg. & Supply Co., Cincinnati, Ohio
Nordberg Manufacturing Company, Milwaukee, Wis.
Northwestern Motor Company, Eau Claire, Wis.
Oliver Iron & Steel Corp., Pittsburgh, Pa.
Overhead Door Company, Hartford City, Ind.
The Oxweld Railroad Service Company, Chicago
The P. & M. Company, Chicago
Pettibone Mulliken Corporation, Chicago
Pittsburgh Pipe Cleaner Company, Pittsburgh, Pa.
Pocket List of Railroad Officials, New York
The Q and C Company, New York
Racine Tool & Machine Co., Racine, Wis.
The Rail Joint Co., Inc., New York
Railroad Equipment, New York
Railroad Products Company, Cincinnati, Ohio
The Rails Company, New Haven, Conn.
Railway Engineering & Maintenance, Chicago
Railway Purchases & Stores, Chicago
Railway Track-Work Company, Philadelphia, Pa.
Ramapo Ajax Division, The American Brake Shoe Company, Chicago
Reade Manufacturng Co., Inc., Chicago
Rust-Oleum Corporation, Evanston, Ill.
Schramm, Incorporated, West Chester, Pa.
Sperry Products, Incorporated, Hoboken, N. J.
Taylor-Colquitt Company, Spartansburg, S. C.
Teleweld, Inc., Chicago
Templeton, Kenly & Co., Chicago
Thornley Railway Machine Company, Joliet, Ill.
Timber Engineering Company, Washington, D. C.
United Laboratories, Cleveland, Ohio
Warren Tool Corporation, Chicago
Woodings Forge & Tool Co.
Woodings-Verona Tool Works, Verona, Pa.
Woolery Machine Company, Minneapolis, Minn.



Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

American Railway Engineering Association—Annual Meeting, March 16-18, 1948, Chicago.

American Wood-Preservers' Association—Annual meeting, April 27-29, 1948, St. Paul, Minn.

Bridge and Building Supply Men's Association—Joint exhibit with Track Supply Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of American Railway Bridge and Building Association and Roadmasters' Association.

Maintenance of Way Club of Chicago—Next meeting, October 27, 1947.

National Railway Appliances Association—Thirty-third annual exhibit, Chicago, March 15-18, 1948, in connection with A.R.E.A. convention.

Railway Tie Association—Annual meeting, September 23-25, 1947, Arlington hotel, Hot Springs, Ark.

Roadmasters' and Maintenance of Way Association of America—Annual meeting, September 16-18, 1947, Hotel Stevens, Chicago.

Track Supply Association—Joint exhibit with Bridge and Building Supply Men's Association, September 15-18, Hotel Stevens, Chicago, during concurrent conventions of Roadmasters' Association and American Railway Bridge and Building Association.

Supply Trade News

Personal

The **Timken Roller Bearing Company,** Canton, Ohio, has announced the opening of a new branch plant in St. Thomas, Ont., under the management of **John Jolly.**

E. T. Erickson, chemical engineer in the industrial water-treating division of the **Dearborn Chemical Company,** has been placed in charge of the city sales department at Chicago.

Walcott P. Hayes, formerly commanding general of the United States army air forces' technical school at Scott Field, Ill., has been appointed representative of the **Hayes Track Appliance Company** at San Francisco, Cal.

Hugh C. Minton, former brigadier general of the United States army service forces, has been appointed production manager of **Koppers Company,** effective July 1. In his new position, Mr. Minton will report directly to Brehon Somervell, president of the firm.

John R. Johnston, sales manager in the Milwaukee (Wis.) district office of the **Carnegie-Illinois Steel Corporation,** has been appointed assistant general sales manager, with headquarters at Pittsburgh, Pa. **Charles E. McIntyre,** assistant manager of the district sales office at Detroit, Mich., has been appointed sales manager of the district sales office at Milwaukee, succeeding Mr. Johnston.

Henry H. Talboys, manager of the Railway Equipment division of the **Nordberg Manufacturing Company,** Milwaukee, Wis., has been elected vice-president in

Henry H. Talboys

charge of the Railway Equipment division at Milwaukee.

Mr. Talboys was born at Osceola, Wis., on September 3, 1881, and received his higher education at Cornell University. From 1904 to 1908 he served with the National Railway Construction Company on construction work, and from 1908 to 1911 he was engaged in mining work with the Oliver Iron Mining Company. In 1912 Mr. Talboys joined the Ingersoll-Rand Company as a salesman, and served in that capacity until 1921, when he became sales manager of the Lake Superior Loader Company. In 1923 he was appointed manager of the railway equipment division of Nordberg, the position he held at the time of his recent election to the vice-presidency.

W. B. Blix has been appointed assistant manager of the Railway Equipment division of the **Nordberg Manufacturing Company,** with headquarters at Milwaukee, Wis. Mr. Blix was born at Brooklyn, N.Y., on January 12, 1912, and was graduated by the University of Pennsylvania in 1934 with a bachelor's degree in civil engineering. He entered railroad service in June, 1934, as a chainman, construction department, of the Pennsylvania, at Baltimore, Md., and served as an assistant on the engineering corps at various points in Delaware and Pennsylvania from November, 1934, to January, 1937. On the latter date he was promoted to assistant supervisor of track, at Wellsville, Ohio, whence he was transferred in December,

W. B. Blix

1938, to Newport, Pa., where he remained until June, 1940, when he was transferred to New York. In October, 1940, Mr. Blix was advanced to supervisor of track, at Lock Haven, Pa., and in July, 1943, he was transferred to Chicago, where he remained until the time of his recent appointment as assistant manager of the Railway Equipment division of Nordberg.

Edward J. Helline has been appointed general sales manager of the Reliance Division of the **Eaton Manufacturing Company,** Massillon, Ohio. For the past three years Mr. Helline has been in charge of snap ring sales, engineering and production.

Carl L. Peirce, Jr., president of Hubbard & Co., Pittsburgh, Pa., has been elected chairman of the board, succeeding **John W. Hubbard,** whose death on June 3 at Atlantic City, N.J., is reported elsewhere in these columns. **Joseph V. Smith,** executive vice-president, has been elected president, to succeed Mr. Peirce.

Wallace B. Hunter, contracting manager of the **American Bridge Company** (a subsidiary of the United States Steel Corporation), at Boston, Mass., has been appointed senior contracting manager of the Chicago district, with headquarters at Chicago, a newly-created position. Mr. Hunter will be in charge of all contracting work in the Chicago district, including the contracting sub-office at Gary, Ind. **Newton O. Holt** continues as contracting manager of the Chicago district.

Harry H. Melville, assistant to the vice-president of the **Simmons-Boardman Publishing Corporation,** at Cleveland, Ohio, has been appointed district sales manager

Harry H. Melville

in charge of advertising sales, Central District, for all the firm's transportation publications, including *Railway Engineering and Maintenance,* with the same headquarters, succeeding **F. H. Thompson,** who, as vice-president, will serve in an advisory capacity.

Mr. Melville was born in Bridgeport, Conn., on September 5, 1894. He entered railroad service with the Lehigh Valley in October, 1914, and was assistant to the advertising and publicity agent when he left that road to join the A. E. F. during World War I. After his release from the Army in April, 1919, he was appointed advertising manager of the Air Reduction Sales Company, serving in that capacity until 1925. Mr. Melville joined Simmons-Boardman in January, 1926, as advertising salesman in the Central territory, advancing to assistant to the vice-president, which position he held at the time of his recent appointment.

The **Black & Decker Manufacturing Co.** has announced the opening of a new factory service branch at 117 E. Ninth Street, Charlotte 6, N.C.

H. C. Wallace, assistant manager of the Louisville (Ky.) district of the **Air Reduction Sales Company,** has been appointed manager of the district, with headquarters at the district sales office in Louisville, succeeding the late **R. S. Moore.** Mr. Wallace will be responsible for the operations of all Air Reduction plants and offices in the Louisville district, which covers the states of Kentucky and Tennessee, and part of Indiana.

Robert P. Nichols has been appointed assistant domestic sales manager of **R. G. Le Tourneau, Inc.,** Peoria, Ill. Joining Le Tourneau after serving in the armed forces, Mr. Nichols has served as field engineer in the installation department, and more recently, as sales supervisor in the export division. An engineering

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graduate of Purdue University, he has been associated with the Caterpillar Tractor Company as a special representative in Central and South America.

The **Air Reduction Sales Company** has announced the opening of two new oxygen plants, one at Baton Rouge, La., and one at Decatur, Ill. **L. J. West,** superintendent of the Airco oxygen plant at Shreveport, La., has been appointed superintendent of the new plant at Baton Rouge. The superintendent of the new plant at Decatur is **G. H. Klingenberg.**

William A. Roberts, vice-president in charge of the Tractor division of the **Allis-Chalmers Manufacturing Company,** has been appointed executive vice-president of the same division. **William C. Johnson,** vice-president in charge of the General Machinery division, has been appointed executive vice-president of the same division. **Marshal L. Noel,** general sales manager of the Tractor division, has been appointed vice-president and general sales manager of the same division. **J. L. Singleton,** manager of the General Machinery division's district sales offices, has been appointed vice-president and director of sales of the same division.

Mr. Roberts joined the Allis-Chalmers tractor organization in 1924 as a salesman, with headquarters at Wichita, Kan.

William A. Roberts

In 1926 he became Canadian sales representative, and two years later he resigned to enter a partnership in a farm equipment dealer-distributorship, with headquarters at Regina, Sask. He returned to Allis-Chalmers in 1930 as agricultural sales manager of the Tractor division, and in 1931 became general sales manager of the division. In 1941 Mr. Roberts was appointed manager of the Tractor division, and in March, 1944, he was advanced to vice-president in charge of that division, the position he held at the time of his recent appointment.

Mr. Johnson entered the service of Allis-Chalmers in 1924. In 1929, following various field and erection assignments, he was named representative of the crushing and cement department in the district office at Atlanta, Ga. Six years later he became the company's general machinery sales representative at Chattanooga, Tenn. In 1937, he was appointed to open the Allis-Chalmers district office at Knox-

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(*Continued from page* 706)

ville, Tenn., and in 1940 he was named sales manager of the crushing and cement department. Two years later he was placed in charge of sales for the general machinery division, succeeding Mr. Geist, who became president of Allis-Chalmers.

W. C. Johnson

In March, 1944, Mr. Johnson was advanced to vice-president in charge of the General Machinery division, the position he held at the time of his recent appointment.

Obituary

Charles K. Mentz, chief inspector of the Sperry Rail Service, Hoboken, N. J., died suddenly of a heart attack on June 13.

John F. Byrne, a vice-president of the Koppers Company, Inc., Pittsburgh, Pa., was killed in an airplane accident at Bainbridge, Md., on May 30.

Frederick A. Preston, vice-president and a director of Poor & Co., Chicago, died in the Lake Forest (Ill.) hospital on June 8.

Mr. Preston was born at Evansville, Ind., on March 10, 1884, and received his higher education at the Sheffield Scientific School of Yale University, graduating with the class of 1906. Soon after his graduation he became associated with the Railway Specialty & Supply Co., which was later known as the P. & M. Co., and was the progenitor of Poor & Co., and chairman of that company's subsidiaries —the P. & M. Co., and the Maintenance Equipment Company. In addition to being a director of Poor & Co., and all its affiliated companies, Mr. Preston was a director of the Illinois Bell Telephone Company, Chicago Railway Equipment Company, Eversharp, Inc., Plye-National Company, and the Kensington Steel Company.

During World War I, Mr. Preston served in the U. S. Army Air Service as a major. In 1935 he was appointed chief of the Chicago Ordnance District, with which he was still associated at the time of his death as chairman of the advisory board. For his work in the Ordnance Department he was awarded in 1946 the Certificate of Commendation and the Meritorious Service Award. Subsequently he

(*Continued on page* 710)

Here's the dirt on roadbeds...

and it's not good unless you get it out. The McWilliams "Mole" will clean your roadbeds for you quickly and efficiently. A crew of only four men can clean 850 to 1200 feet of shoulder in 8 hours with the shoulder model illustrated. Five men can do a similar job with the intertrack model.

Manufacturers of The McWilliams "Mole" and RMC Rail Joint Packing

RAILWAY MAINTENANCE CORP.

PITTSBURGH 30, PENNSYLVANIA

(*Continued from page* 708)
received the official commendation of the War Department in the form of the Exceptional Civilian Service Award. And in February, 1947, he was honored with the Medal for Merit and a Presidential citation. At the time of his death he was a

Frederick A. Preston

member of the board of directors of the Army Ordnance Association.

Mr. Preston was active in civic and philanthropic affairs. He served as chairman of the campaign committee of the Chicago Community Fund in 1934, and remained a member of the board until 1940. In 1944 he headed the Sponsors' Committee for the American Red Cross Campaign. In addition, he was a member of the board of trustees of the Chicago Zoological Society, the Executive committee of the Chicago Council on Foreign Relations, the Chicago Plan Committee, and the Art Institute of Chicago. He was also on the board of managers of the Y. M. C. A., and for many years he was president of the Park Board of Lake Forest, Ill.

John W. Hubbard, chairman of the board of Hubbard & Co., Pittsburgh, Pa., died on June 3, in the Atlantic City Hospital, Atlantic City, N.J., at the age of 82.

John W. Hubbard

Mr. Hubbard was born at Pittsburgh on December 18, 1864, and was graduated by the Pennsylvania Military College in 1887. He immediately went to work in the company being operated by his father, which was organized in 1843. Upon the death of his father in 1897, Mr. Hubbard purchased the shovel division of the business, which, under his direction, developed into the present company. In 1900 the company added to its activities the manufacture of pole-line hardware, in addition to which it now fabricates railroad track tools, rail anchors and alloy spring washers. Besides his industrial interests and activities, Mr. Hubbard took an active part in the development of river navigation and organized the Mississippi Navigation Company and the Campbell Transportation Company. He was, in addition, a director of various industrial concerns.

Trade Publications

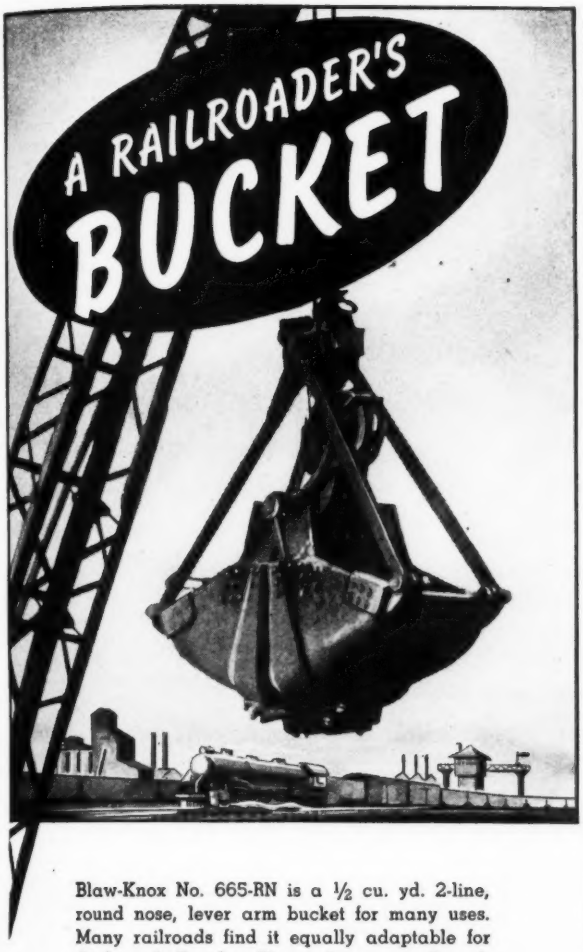
(To obtain copies of any of the publications mentioned in these columns, use postcards, page 645)

Ohio Lifting Magnets—The Ohio Electric Manufacturing Company has published an eight-page bulletin, No. 112, describing the company's lifting magnets. Well illustrated with photographs showing the magnets in a variety of applications, the bulletin contains details of construction, tables of dimensions and capacities, and an illustrated description of necessary magnet-control equipment.

The Action of Embeco in Concrete and Mortar—This is a 34-page booklet published by the Master Builders Company, 706 Euclid avenue, Cleveland 3, Ohio, in which the shrinkage of concrete and mortar, its influence on durability and serviceability and the principal factors affecting it are discussed, along with its control and elimination. The booket includes many charts, graphs and other useful technical data, and describes the use of Embeco for machinery and heavy equipment grouting cement-gun work and the patching and repairing of concrete.

Caterpillar Motor Graders—The Caterpillar Tractor Company has issued two new folders describing the company's new Diesel motor graders, No. 12 and No. 112, the first powered with a 100-hp. engine, the second with an engine of 70 hp. Both folders contain information concerning features of construction and operation, such as engine improvements, a new six-speed constant-mesh transmission, effective anti-coasting brakes, and an arched front axle for high clearance.

Orangeburg Fibre Pipe—The Fibre Conduit Company has issued a catalog, known as No. 304, which contains 24 pages of material describing the characteristics of the company's Orangeburg fibre pipe—its construction, advantages, and applications. The catalog is well supplied with illustrations of Orangeburg installations—both old and new. Several pages are devoted to an exposition of the mechanical and hydraulic properties of fibre pipe and carry useful flow charts. Other pages deal with the application of Orangeburg perforated pipe to drainage problems, while still others are devoted to fittings—couplings, adapters, sleeves, reducers, and sweeps. Included also are details of equipment for the field tooling of taper joints.



Blaw-Knox No. 665-RN is a ½ cu. yd. 2-line, round nose, lever arm bucket for many uses. Many railroads find it equally adaptable for ditching, ballast handling, refuse removal, coaling, etc. Like all Blaw-Knox Buckets, it gets more work done with less crane time. For a quick look at the many types and sizes of Blaw-Knox Buckets in railroad use—write today for Bulletin No. 1989.

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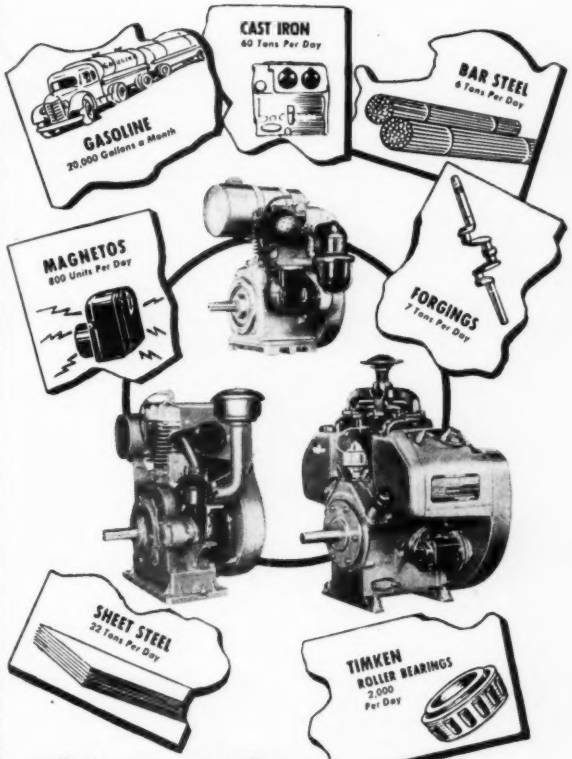


This Is What It Takes to Build WISCONSIN *Air-Cooled* ENGINES

In terms of freight tonnage, the materials and components used in making Wisconsin Air-Cooled Engines would total up something like this:

Sheet Steel	550 tons per month
Forgings	175 tons per month
Bar Steel	150 tons per month
Cast Iron	1500 tons per month

That's a lot of tonnage. Over and above this, we use 20,000 Magnetos per month and 50,000 Timken tapered roller bearings . . . not to mention 20,000 gallons of gasoline per month for factory test runs of Wisconsin Air-Cooled Engines.

But entirely aside from the matter of materials and tonnage are the important engineering and production functions of building HEAVY-DUTY SERVICEABILITY into every Wisconsin Air-Cooled Engine. In the final analysis, this is what counts . . . and accounts for the extensive use of Wisconsin Air-Cooled Engines in Railway maintenance operations.

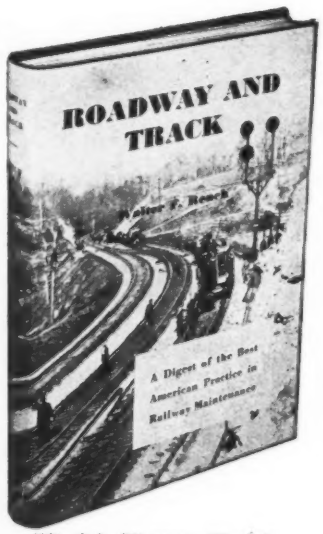
WISCONSIN MOTOR Corporation
MILWAUKEE 14, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

New Third Edition

ROADWAY AND TRACK

By Walter F. Rench

Formerly Supervisor on the Pennsylvania Railroad;
Author of *Simplified Curve and Switch Work*



1946. 3rd. 350 pages, 101 photographs, 19 line drawings, 12 tables, index, 6 x 9, cloth, $5.00

The new edition features the use of the latest mechanical equipment in connection with roadway and track maintenance. Older methods employed where full mechanical equipment is not available are also explained. While most of the methods described are those which are standard on the *Pennsylvania,* A.R.E.A. recommended practices and those in use on other well maintained roads have also been included.

Outstanding types of mechanical equipment used in track work are described and illustrated with action photographs. Engineering drawings show working details. The economies resulting from the adoption of modern methods are clearly outlined. Useful tables have been added to make the book suitable for reference use, as well as a practical handbook on modern methods.

For Track Supervisors

While written primarily to serve the needs of track supervisors and other maintenance officers, the new edition contains material of considerable interest to transportation and mechanical officers who require a working knowledge of the fundamentals of maintenance of way practice. Section and extra-gang foremen, who wish to acquire a broader knowledge of their work and of methods used elsewhere, will find the book helpful.

CONTENTS

Part I—ROADWAY: Essential Elements in Roadway Maintenance—The Right of Way—Drainage of Roadbed and Track—Vegetation for Banks—Economics of Roadway Machines—Labor Saving Methods and Devices in Roadway Work—Small Tools and Their Uses.

Part II—TRACK: Essential Elements in Maintenance of Track—Program for Maintenance of Way and Structures Work—The Track Obstruction—Power Machines and Equipment—Labor Saving Methods in Track Work—Track Materials and Their Uses—Practice in Rail Renewals—Practice in Rail Repair and Inspection—Maintenance of Main Tracks—Maintenance of Yards and Terminals.

Part III—SPECIAL PROBLEMS AND DUTIES: Maintenance Problems and Methods Used—Economics of Track Labor—Special Duties in the Maintenance of Way Department.

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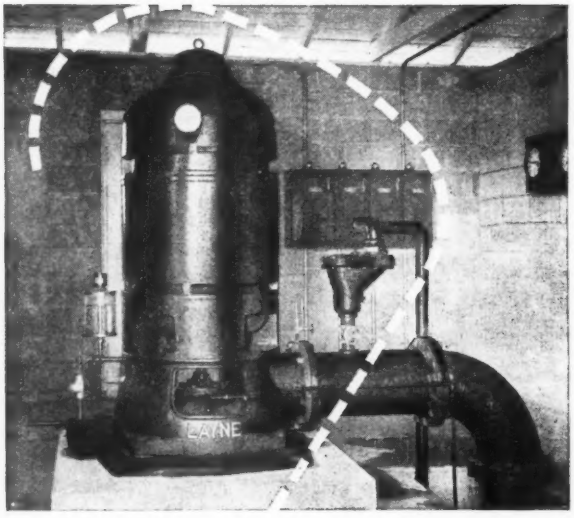

DOWN IN —WARRINGTON, FLORIDA

They Bought Known Quality

Back in 1937, when the Peoples Water Service Company bought their first Layne Well Water System to serve the city of Warrington, Florida, they had only 263 connections. But Warrington, being a fine home city, grew larger and larger. By 1941 a second unit was needed, and being guided by an appreciation of known quality, none but a Layne Well Water System was to be considered. In 1945, connections had increased to 3,200, so again additional water supply was needed.

Peoples Water Service Company now have their third Layne Water System . . . one of the finest and most complete in the entire state. Powered with a 100 h.p. electric motor, turning at 1170 r.p.m., this new system is producing 1150 gallons of water per minute. The well is underreamed and packed with 20 yards of sized gravel.

Standardization on Layne Well Water producing equipment, was a very wise move. Production cost of water is exceptionally low and dependability of equipment is a major asset.

For further information on Layne Well Water developing service, address Layne & Bowler, Inc., General Offices, Memphis 8, Tennessee.

***LAYNE PUMPS* for lakes, rivers, reservoirs, irrigation, for any use where large quantities of water must be produced at low cost. Sizes range from 40 to 16,000 gallons per minute, powered by electric motor, V-belt or right angle gear drives. Write for Layne Pump Catalog.**

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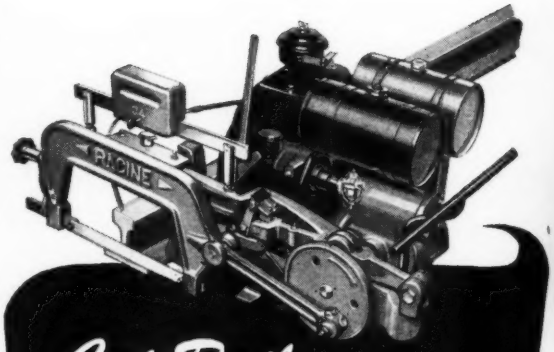


Cut Rail . . . RIGHT ON THE TRACK *with . . .*

RACINE PORTABLE Rail Saws

Your track maintenance and repairs can be speeded up with Racine Portable Rail Cutting Machines. This equipment cuts rail ends right on the track. No extra handling or hauling of the rail to central cropping plant.

Only one man needed to operate the Racine Rail Saw. Two men can easily carry it from rail to rail. These fast, accurate machines produce smooth, clean cuts without the overheating of rail ends that so often starts fractures leading to rail failure. Model 15 for rails to 7⅜" high; Model 16 for rails to 10" high.

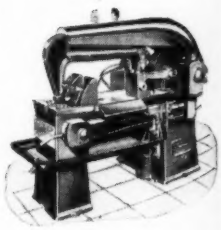
SIX COMMON JOBS FOR THIS MACHINE

1. Cutting and fitting rails at interlocking plants, crossings and switches.
2. Closing track in rail-laying operations.
3. Smooth, accurately cut rail for insulated joints.
4. Proper staggering of joints in curves.
5. Removing split, worn and battered rail ends.
6. Cutting out sections of wheel burned rails and fissures.

Models are available with gas engines, compressed air or electric motors. Write for complete catalog No. 58A. Address RACINE TOOL AND MACHINE CO., 1738 State St., Racine, Wisconsin.

RACINE HEAVY DUTY METAL SAWS FOR RAILROAD SHOPS

Cut axle shafts, boiler pipe, channels, angles and beams quickly and accurately. Models are available in all price ranges for either high speed production metal cutting or general all around shop work. Capacities 6" x 6" to 20" x 20". Ask for general catalog No. 12 giving description of complete Racine Saw line.



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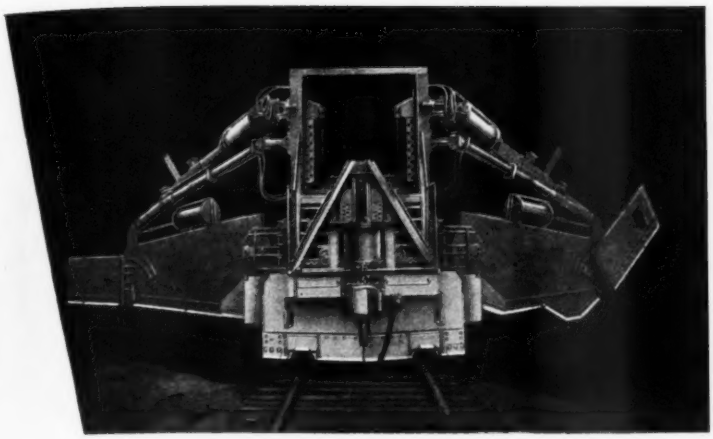

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—with the **JORDAN**

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The Jordan Book *shows this versatile machine at work*—50 action photos. Send for it.

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- CUT DITCHES
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LOOK AT THESE MANY JOBS THAT THE JORDAN *DOES WELL*

including some that no other single machine *can do*

O. F. JORDAN COMPANY

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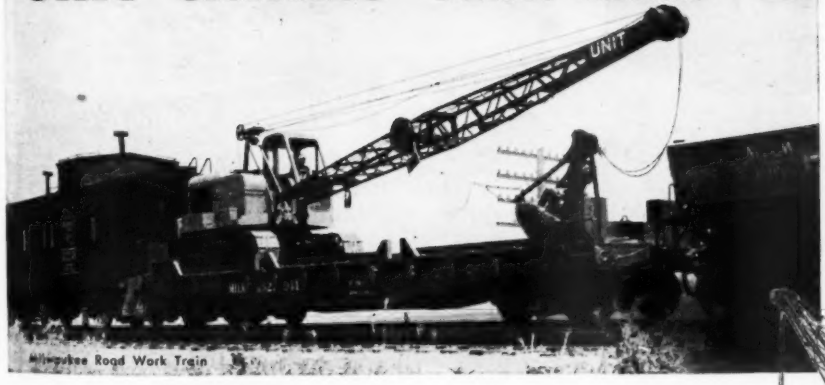
UNIT CRANES *"Tailor-made" for Railroad Jobs*



Milwaukee Road Work Train

Something unusual in construction is this flat car crawler crane carrier. It consists of guide angles laid lengthwise along top of car to form a runway for the crawlers. Machine can travel full length of car without danger of running off. The car is divided into three sections which act as operating positions as the work progresses. Crossbeam dividers can be inserted as stabilizers while the machine is in operation, or when the entire train is moving.

Mobile **UNITS** for Yard Work

UNIT 357 Mobile Crane is self-propelled ... Rides on rubber ... Ready for action with a push on the starter ... Travels anywhere ... gets there in a hurry. Fully convertible to all attachments ... Operated by ONE man ... Powered by ONE engine ... Controlled from ONE position in UNIT's safety promoting FULL VISION CAB.

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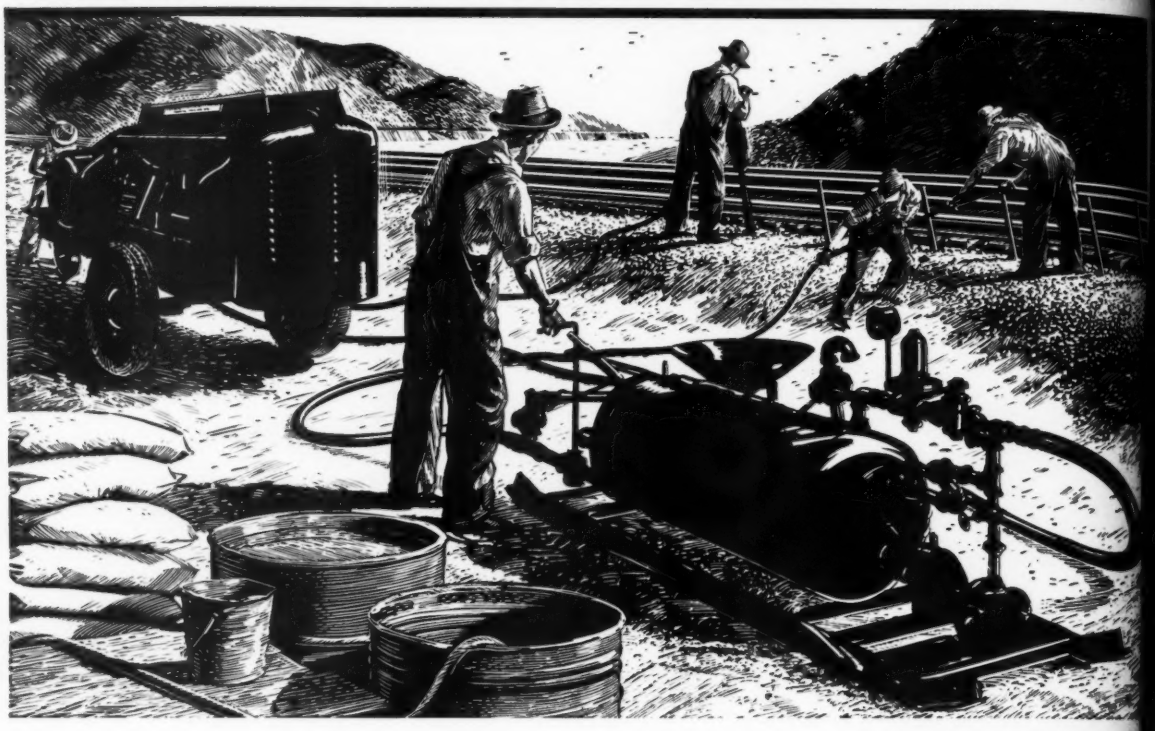
ALPHABETICAL INDEX TO ADVERTISERS, JULY, 1947


Powerful spring washers, like watchmen, day and night, add assurance, safety and comfort over thousands of miles of track.
They equalize bolt tensions, protect rail ends and joint bars, absorb shocks and stresses . . . Improved Hipowers reduce maintenance costs—
IMPROVED HIPOWERS
IMPROVE TRACK
THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.
A COMPLETE LINE OF RAILWAY SPRING WASHERS

GIVING THE ROAD BED SOLID SUPPORT



Your roadbed maintenance costs head for the cellar when Blue Brute Track Teams . . . *fast working, economical, matched* . . . stiffen the track's backbone.

Take the new Blue Brute Horizontal Grout Mixer-Ejector for example . . . a portable, air operated machine that works at pressures up to 100 psi. It handles a wide range of grout consistencies easily, efficiently . . . gives positive, thorough mixing . . . provides agitation during work interruptions . . . includes a by-pass arrangement allowing operator to use air blast without disconnecting grouter.

*Reg. U.S. Pat. Off.

And look at the Blue Brute Compressor . . . a tough, two-wheeled tornado with a capacity of 105 cubic feet — enough to run Mixer-Ejector, Air Hammer and Tie Tampers — with plenty of punch in reserve. It's built for real economy, too . . . Feather* Valves for efficient air control . . . Fuel Saver that regulates flow to give you the most air per gallon.

Matched partners in the Blue Brute Track Team are hard slugging Air Hammers and Tie Tampers . . . designed for speed, economy and ease of handling . . . also a complete line of track grouting accessories. Blue Brute Track Teams will keep you consistently ahead your maintenance schedule . . . and substantial savings. Contact your B Brute distributor — he'll prove to y *there's more worth in a Blue Bru*

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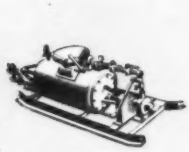

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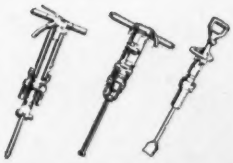

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Railcar Compressor

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